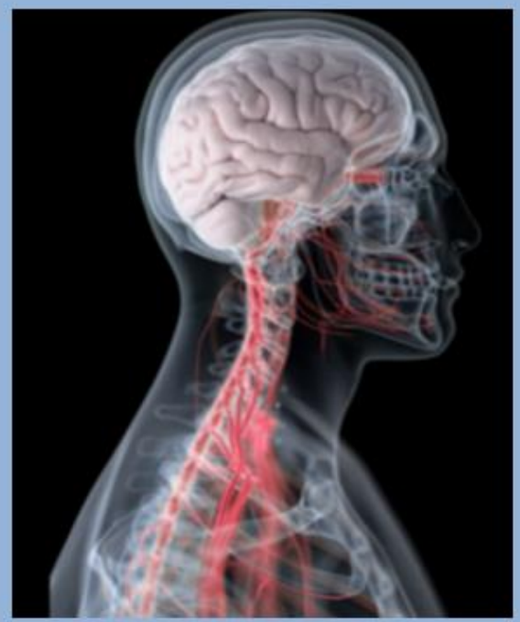
Central Nervous System Module



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Prepared By	Reviewed By	Approved By
Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor

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Prof Naeem Akhtar, Dr Ifra Saeed, Dr. Ayesha Yousaf, Dr Sidra Hamid, Dr Tehmina Qamar	2017-2018	1st	Developed for Second Year MBBS. Composed of Horizontally and vertically Integrated Central Nervous System (CNS).
Dr Tehzeeb, Dr Samia Sarwar, Dr Ifra Saeed, Dr. Ayesha Yousaf, Dr Tehmina Qamar, Dr Sidra Hamid	2019-2020	2nd	Developed for Second Year MBBS. Horizontally and vertically integrated Learning objectives updated
Dr Tehzeeb, Dr Samia Sarwar, , Dr Ifra Saeed, Dr Ayesha Yousaf , Dr Tehmina Qamar, Dr Sidra Hamid	2021-2022	3rd	Developed for Second Year MBBS. Horizontally and vertically integrated Learning objectives updated, Research curriculum incorporated
Dr Tehzeeb, Dr Samia Sarwar, Dr Ifra Saeed, Dr Ayesha Yousaf, Dr Tehmina Qamar, Dr Sidra Hamid	2022-2023	4th	Developed for Second Year MBBS. Horizontally and vertically integrated Learning objectives updated, Research, Bioethics, Family Medicine curriculum incorporated along with Professionalism
Dr Samia Sarwar, Dr Ifra Saeed, Dr Ayesha Yousaf, Dr. Aneela Jamil, Dr Sidra Hamid	2023-2024	5th	Developed for Second Year MBBS. Horizontally and vertically integrated Learning objectives updated, Research curriculum revamped Bioethics, Family Medicine curriculum incorporated along with Professionalism. Entrepreneurship curriculum incorporated

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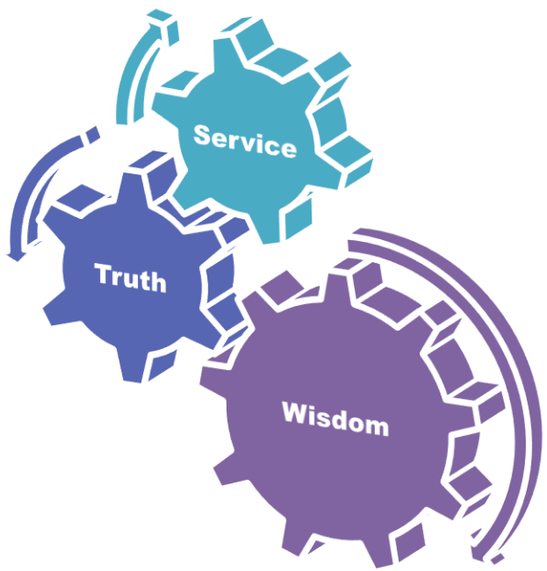
University Moto, Vision, Values & Goals

RMU Motto



Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

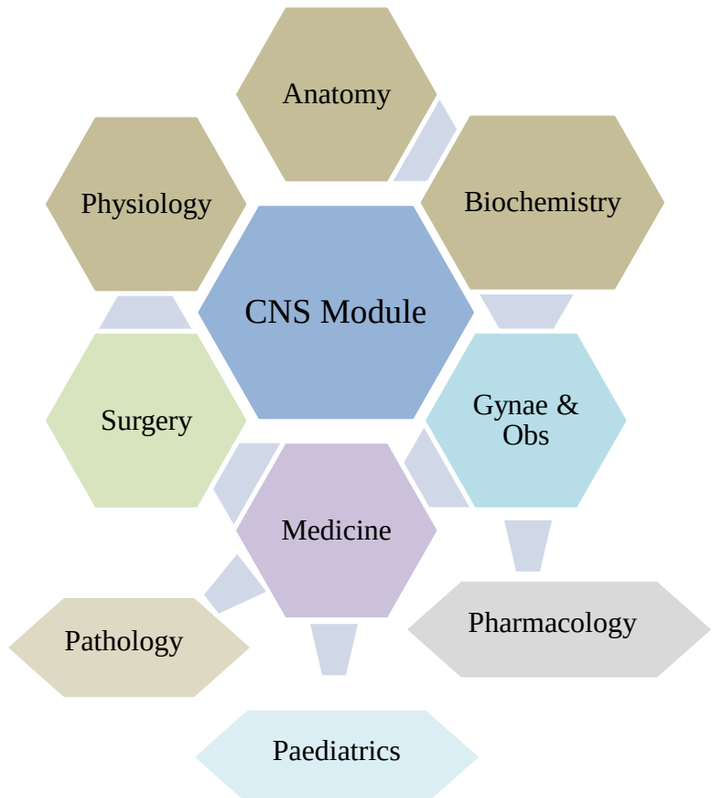
- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

Second Year MBBS 2024

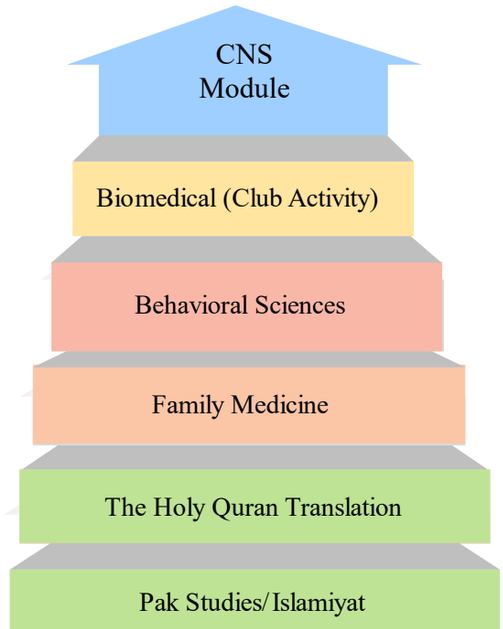
Study Guide

CNS Module

Integration of Disciplines in CNS Module



Spiral / General Education Cluster Courses



Discipline Wise Details of Modular Contents

Subjects	Embryology	Histology	General Anatomy	Gross Anatomy
• Anatomy	• Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Peripheral Nervous System	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System.	• Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS • Cross Sectional Anatomy of CNS
• Biochemistry	• Fatty acid metabolism • Cholesterol Metabolism • Ketone bodies metabolism • Lipoproteins and Phospholipids • Fatty Liver and hyper Lipidemias. • Glycerophospholipid & Sphimgo phospholipid			
• Physiology	• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain, Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture			

	• Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus • Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action, Conditioned reflexes & Properties of reflex action, Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity
Spiral Courses	
• The Holy Quran Translation	• Imaniyaat-5 • Imaniyaat-6 • Momalat-I • Momalat-II
• Pak Studies / Islammiyat	• Musawat • Tehreek-e-Pakistan (1940-1947) • Khwateen k hakook • Qayam e Pakistan, Ibtidai Mushkilaat
• Bioethics & Professionalism	• Ethical dilemmas in healthcare practice involving breach in principle of autonomy • Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Ethical dilemmas practice involving breach in principle of justice
• Radiology & Artificial Intelligence	• Skull radiograph • CT Scan & MRI
• Family Medicine	• Approach to a patient with headache
• Behavioral Sciences	• Emotions • Memory
Vertical Integration	
• Pharmacology	• Introduction to CNS
• Pathology	• Patterns of injury in nervous system • Meningitis
• Pediatrics	• Meningitis

	• Cerebral palsy, Polio
• Surgery	• Spinal injury and head injury • Management of hydrocephalus • Brain abscess • Polytrauma patient
• Medicine	• Spinal cord and peripheral nervous system • Encephalitis • Cerebellar disorders • Epilepsy and other convulsive disorders • Stroke
• Gynecology & Obs	• Seizures during pregnancy (eclampsia/ epilepsy)
Early Clinical Exposure (ECE)	
• Medicine	• Cases of stroke • Paraplegia • Vegetative state
• Surgery/ Neurosurgery	• Head injury. • Nerve injuries
• Radiology	• CT scan • Brain • Normal • Stroke • Hemorrhage • Infarction Hydrocephalus • Brain atrophy • Brain Edema • Skull/ spine Fractures • MRI Brain/ Spine

Table of Contents

CNS Module Team

Module Name	:	CNS Module
Duration of module	:	06 Weeks
Coordinator	:	Dr. Arsalan Manzoor Mughal
Co-coordinator	:	Dr. Gaiti Ara
Reviewed by	:	Module Committee

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Director DME	Prof. Dr. Ifra Saeed
3.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy Second Year MBBS	Dr. Maria Tasleem
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Arsalan Manzoor Mughal (Associate Professor of Anatomy)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Gaiti Aara ((APWMO of Anatomy)
4.	Co-Coordinator	Dr. Rahat (Senior Demonstrator of Biochemistry)
5.	Co-coordinator	Dr. Shazia (Senior Demonstrator of Physiology)

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr Farzana Fatima
3.	DME Implementation Team	Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz
4.	Editor	Muhammad Arslan Aslam

Module IV – CNS Module

Rationale: The human nervous system is the most complex and versatile achievement of the process of evolution. The nervous system of all animals functions to detect changes in the external and internal environment and to bring about appropriate responses in the muscles, organs and glands.

The anatomical, physiological, biochemical and molecular foundation of some of these aspects of neural function are well understood, while others continue to occupy the professional lives of many thousands of researchers in both the basic and clinical sciences.

The nervous system is often damaged by inherited or developmental abnormalities by disease processes and by traumatic injury. The prevention, diagnosis and management of neurological disorders are therefore of immense socioeconomic importance.

This module is expected to build the student's basic knowledge about the normal structure, organization, functions and development of nervous system. This knowledge, skills and attitudes acquired will serve as a fabric on which the student will weave further knowledge about the etiology, pathology and pathogenesis of diseases of nervous system and the principles of their management.

Module Outcomes

By the end of the module, students will be able to:

Knowledge

- Describe the development, structure, functions and biochemical processes of the nervous system.
- Briefly describe the injuries and diseases of the nervous system such as Alzheimer's disease, Parkinson's Disease, etc.
- Classify the main drug groups actin on the nervous system.
- Identify the medical conditions related to nervous system such as stroke, cerebellar disorders, meningitis etc.
- Identify the surgical conditions related to the nervous system such as head injury brain tumors and abscesses.
- Identify obstetrical conditions related to nervous system such as preeclampsia.
- Identify pediatric conditions related to nervous system such as meningitis, cerebral palsy and polio.
- Identify parts of the CNS on radiographs CT scans and MRIs.
- Identify ENT and ophthalmological conditions such as acoustic neuroma and strabismus.
- Describe aspects of behavioral sciences such as Emotions and Memory.

- Used technology based Medical Education including Artificial Intelligence.
- Appreciate concept and importance of Biomedical Ethics, & Research.

Skills

- Demonstrate dissection and identification of various parts of the nervous system.
- Identify, draw and label histological slides of the nervous system.
- Perform examination of sensory system, motor system, special senses and cranial nerves.
- Demonstrate effective skill for performing estimation of cholesterol, triglycerides and HDL.
- Demonstrate awareness of ethical, legal and social implication of issues related to bioethics

Attitude

- Demonstrate professional attitude, team building spirit and good communication specially in small group discussions.

This module will run in 6 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

SECTION - I

Terms & Abbreviations

Contents

Tables & Figures

Table1. Domains of Learning According to Blooms Taxonomy

Sr. #	Abbreviation	Domains of learning
1.	C	**Cognitive Domain:** knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	**Psychomotor Domain:** motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	**Affective Domain:** feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

Teaching and Learning Methodologies / Strategies

Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will the followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patients, interviews, and exercises, etc. Students are actively involved in the learning process.

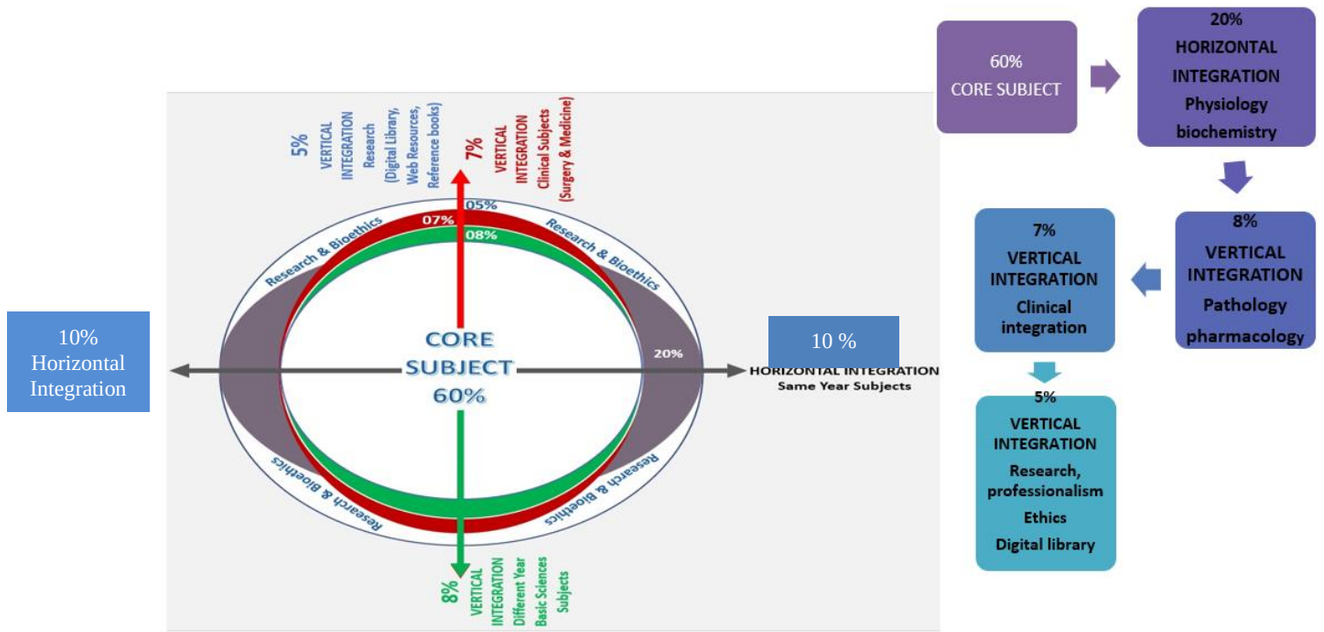


Figure 1. Prof Umar's Model of Integrated Lecture

Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

Table 2. Standardization of teaching content in Small Group Discussions

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

Table 3. Steps of Implementation of Small Group Discussions

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

Self-Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:

  i Will be online on LMS (Mid module/ end of Module)

  ii.OSPE station

Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  i. To provide students with a relevant opportunity to see theory in practice
  ii. Require students to analyze data in order to reach a conclusion.
  iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)		
Step 7	Syntheise & Report	Session - II
Step 6	Collect Information from outside	
Step 5	Generate learning Issues	Session - I
Step 4	Discuss and Organise Ideas	
Step 3	Brainstorming to Identify Explanations	
Step 2	Define the Problem	
Step 1	Clarify the Terms and Concepts of the Problem Scenario	
Problem- Scenario		

Figure 2. PBL 7 Jumps Model

Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by Head of Department Dean Medical education department QEC	

SECTION – II

Learning Objectives, Teaching Strategies & Assessments

Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

Anatomy Large Group Interactive Session (LGIS)

Topic	At The End Of The Session Student Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
General Anatomy Nervous System	• Discuss the major divisions of nervous system	C2	LGIS	MCQs SAQs SEQs VIVA
	• Differentiate between neurons and neuroglia	C2		
	• List the neuroglia and their functions	C1		
	• Describe myelination of nerve fibers	C2		
	• Describe the structure of a peripheral nerve and reflex action	C2		
	• Describe degeneration and regeneration of nerves	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Embryology Early development of Skull & Central Nervous System	• Describe the process of development of neurocranium and viscerocranium	C2	LGIS	MCQs SAQs SEQs VIVA
	• Describe formation of neural tube, neuropores and their closure	C2		
	• Describe histogenesis and Cytodifferentiation within the neural tube.	C2		
	• Describe the brain flexures and their derivatives	C2		
	• Describe role of neuroblasts forming efferent and afferent rows.	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Embryology	• Describe the significance of ventricular, mantle and marginal layers of developing spinal cord.	C2	LGIS	MCQs SAQs

Development of spinal cord	• Enumerate derivatives of alar and basal plates in developing spinal cord.	C1		SEQs VIVA
	• Describe the process of myelination of nerve fibers.	C2		
	• Describe role of neural crest cells in development of spinal ganglia.	C2		
	• Explain positional changes of spinal cord.	C2		
	• Discuss congenital anomalies due to neural tube defects and abnormal histogenesis.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
General Anatomy Autonomic Nervous System	• Enlist the components of peripheral and autonomic system.	C1	LGIS	MCQs SAQs SEQs VIVA
	• Tabulate differences between sympathetic and parasympathetic nervous systems	C2		
	• Describe effects of sympathetic and parasympathetic nervous systems on various parts of the body	C2		
	• Discuss the anatomical basis of autonomic injuries such as Horner's syndrome, Urinary bladder dysfunction, rectal distention, Erectile dysfunction are argyll Robertson pupil.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Histology Meninges, Choroid Plexus, Peripheral Nervous system and ganglia	• Describe the histological structure of meninges and choroid plexus	C2	LGIS	MCQs SAQs SEQs VIVA
	• Discuss the histological structure of Myelinated and unmyelinated nerve fibers	C2		
	• Discuss the histological structure of sensory and autonomic ganglia	C2		
	• Discuss the principles of neuroplasticity and regeneration	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Embryology	• Describe the development of Myelencephalon.	C2	LGIS	MCQs SAQs
	• Describe the arrangement of neuroblasts in metencephalon	C2		

Development of Rhombencephalon	• Describe the development of metencephalon.	C2		SEQs VIVA
	• Describe the arrangement of neuroblasts in metencephalon	C2		
	• Describe the development of cerebellum	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Histology Spinal Cord and Cerebellum	• Describe the histological structure of spinal cord	C2	LGIS	MCQs SAQs SEQs VIVA
	• Describe the histological structure of cerebellum	C2		
	• Discuss cells in each layer along with its histological morphology	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Embryology Development Mesencephalon and Prosencephalon	• Describe the development of mesencephalon	C2	LGIS	MCQs SAQs SEQs VIVA
	• Describe the arrangement of neuroblasts in mesencephalon	C2		
	• Describe the development of mesencephalon	C2		
	• Describe the arrangement of neuroblasts in mesencephalon	C2		
	• Describe the development of pituitary gland	C2		
	• Discuss the anatomical basis of pharyngeal hypophysis and craniopharyngiomas	C3		
	• Discuss the anatomical basis of birth defects such as encephalocele, microencephaly, microcephaly, Chiari malformation.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Histology Cerebrum	• Describe the histological structure of cerebrum	C2	LGIS	MCQs SAQs SEQs
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		

	• Apply strategic use of A.I in health care.	C3		VIVA
	• Read relevant research article.	C3		
Embryology Development of peripheral and autonomic nervous system	• Describe the development cranial nerves	C2	LGIS	MCQs SAQs SEQs VIVA
	• Describe the development of spinal nerves	C2		
	• Describe the development of sympathetic nervous system	C2		
	• Describe the development of parasympathetic nervous system	C2		
	• Correlate with the clinical conditions	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Embryology Development of Cranium	• Describe the development of different steps of cartilaginous and membranous viscero cranium and neuro-cranium.	C2	LGIS	MCQs SAQs SEQs VIVA
	• Discuss the postnatal growth of the cranium	C2		
	• Correlate with the clinical conditions.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		

Physiology Large Group Interactive Session (LGIS)

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Objectives	Teaching Strategy	Assessment Tools	References	Learning Resources
Organization of Nervous System Mechanism of synaptic transmission	• Describe the general organization of nervous system	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03.	• https://youtu.be/432AD7JZnKE https://www.osmosis.org/learn/Somatosensory_pathways
	• Describe major levels of CNS functions	C1				
	• Briefly explain nerve fiber structure, classification & properties	C2				
	• Describe labeled line principle	C1				
	• Define synapse	C1				
	• Enumerate & compare types of synapses	C2				
	• Describe process of synaptic transmission	C1				

	• Enumerate the important neurotransmitters of nervous system	C1			Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	
Classification of sensory receptors Properties of sensory receptors	• Enumerate & explain different types of sensory receptors according to function	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	• https://youtu.be/432AD7JZnKE https://www.osmosis.org/learn/Somatosensory_pathways
	• Enumerate & explain different types of sensory receptors according to location	C2				
	• Enlist various properties of sensory receptors	C1				
	• Describe mechanism of signal transduction & generation of receptor potential	C1				
	• Describe mechanism of adaptation of different types of receptors	C1				
	• Describe the properties of sensory receptors	C1				
	• Describe the types and characteristics of tactile receptors	C1				
Properties of synaptic transmission	• Briefly explain the electrical events during neuronal excitation and inhibition	C2	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	• https://youtu.be/432AD7JZnKE https://www.osmosis.org/learn/Somatosensory_pathways
	• Explain temporal and spatial summation	C1				
	• Enlist & explain various characteristics of synaptic transmission	C1				
Physiology of pain Dual pathway for transmission of pain Analgeia System	• Define pain	C1	LGIS	MCQ SEQ		
	• Enumerate different types of pain	C2				
	• Tabulate the differences between two types of pain	C1				
	• Describe characteristics of pain receptors	C1				
	• Discuss the mechanism of stimulation of pain	C2				

Thermal Sensations	receptors			VIVA		
	• Compare and contrast neospinothalamic & paleo spinothalamic tract	C2				
	• Define referred pain	C1				
	• Explain the mechanism of referred pain	C2				
	• Give examples of referred pain	C1				
	• Describe visceral pain and its causes	C1				
	• Define headache	C1				
	• Enlist the types of headache & their causes	C1				
	• Explain the analgesia system	C2				
	• Describe thermal receptors	C1				
	• Explain mechanism of excitation of thermal receptors	C2				
	• Describe transmission of thermal signals in nervous system	C1				
Sensory pathways for transmitting somatic signals	• Classify somatic senses	C2	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	• https://youtu.be/432AD7JZnKE https://www.osmosis.org/learn/Somatosensory_pathways
	• Describe the sensory pathways for transmission of somatic sensations to central nervous system	C1				
	• Enumerate sensations carried by dorsal column system and anterolateral system	C1				
	• Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system	C1				
	• Compare and contrast dorsal column medial lemniscal system and anterolateral system	C2				
Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 255,259) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous System(Chapter 02. Page 47,59) • Human Physiology by Dee	• https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system https://youtu.be/j9pUItHAAhs https://youtu
	• Enumerate the functions of autonomic nervous system	C1				
	• Describe sympathetic and parasympathetic nervous system	C1				
	• Enumerate & explain their receptors, neurotransmitters & physiological effects	C1				

	• Describe physiological anatomy & effects of adrenal medulla	C1			Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 392) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 763,765)	.be/7pGKa-1tSJw https://youtu.be/gBOAYgMxq-Q
Somatosensory cortex & lesions of somatosensory cortex	• Explain cortical mapping & association cortex • Describe lesions of somatosensory areas • Summarize role of thalamus in somatic sensations • Interpret the importance of dermatomes	C2 C1 C1 C3	LGIS	MCQ SEQ VIVA	• Textbook of Medical Physiology by Guyton & Hall.14th Edition.(Chapter 48,Page 603) https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.html	https://teachmeanatomy.info/neuroanatomy/pathways/ascending-tracts-sensory/
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	• Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response • Draw a table showing autonomic effects on various body organs • Briefly describe the pharmacology of autonomic nervous system	C2 C1 C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 264) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous • System(Chapter 02. Page 55) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 397) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 768)	• https://youtu.be/7pGKa-1tSJw • https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system
CSF, Blood Brain Barrier, Blood CSF Barrier, Lumber Puncture	• Describe briefly the physiological anatomy of cerebral blood flow • Explain cerebrospinal fluid system • Describe the CSF pressure, its measurement by lumbar puncture, & hydrocephalus • Explain blood CSF barrier & BBB • Describe brain edema	C1 C2 C1 C2 C1	LGIS	MCQ SEQ VIVA	• Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 113) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 62, Page 777-784)	• https://youtu.be/f9xi1Rf5m9w https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier

Concept of Association areas, dominant and non-dominant cerebral hemispheres	• Draw association areas of brain	C1	LGIS	MCQ SEQ VIVA	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 58, Page 727)	https://my.clevelandclinic.org/health/articles/23073-cerebral-cortex https://youtu.be/2Z425-CHY1c
	• Describe association areas of brain regarding their physiological role	C1				
	• Explain briefly the clinical features, if the association areas become damaged	C2				
	• Describe concept of dominant hemisphere	C1				
	• Enlist role of parieto-occipito temporal cortex in non-dominant hemisphere	C1				
Limbic system Functions of hypothalamus	• Describe the concept of limbic system	C1	LGIS	MCQ SEQ VIVA	Textbook of Medical Physiology by Guyton & Hall.14th Edition	• https://youtu.be/h3K9RfGw8sI https://www.endocrineweb.com/endocrinology/overview-hypothalamus
	• Describe physiological anatomy of limbic system	C1				
	• Enumerate and explain the roles of hippocampus, amygdala and limbic cortex	C1				
	• Describe physiological anatomy of hypothalamus	C1				
	• Enlist functions of hypothalamus	C1				
	• Explain role of hypothalamus in: o Vegetative function o Endocrine function Behavioral function o Reward and punishment function	C2				
Speech and aphasia	• Describe sensory and motor aspects of communication	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 15, Page 290,293) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 1211)	• https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 https://www.stroke.org.uk/what-is-aphasia/types-of-aphasia
	• Define Wernicke's aphasia, Motor aphasia & Global aphasia	C1				
	• Explain Wernicke's aphasia, Motor aphasia & Global aphasia	C2				
	• Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	C1				
Learning and memory	• Define memory & classify its various types	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 15, Page 283) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 112) • Human Physiology by Dee	• https://youtu.be/EqdsQDM5Fys https://www.sciencedirect.com/topics/psychology/learning-and-memory
	• Describe role of synaptic inhibition and synaptic facilitation in memory	C1				
	• Explain mechanism of short term, intermediate and long-term memory	C2				
	• Describe mechanism of consolidation of memory	C1				
	• Enumerate specific parts of brain involved in memory	C2				

	• Explain the role of each part	C2			Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 09 Page 332) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 58, Page 735)	
Reticular activating system and sleep	• Describe activating driving system of the brain	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 269,272,278) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Sensory Physiology (Chapter 10 Page 344) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 12031208) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 753)	• https://youtu.be/TdGQvWAZ0Cs https://www.physio-pedia.com/Reticular Formation
	• Explain the reticular activating system	C2				
	• Discuss the control of cerebral activity by signals from brain stem	C2				
	• Explain neurohormonal system of the brain	C2				
	• Define sleep and enumerate types of sleep	C1				
	• Compare and contrast between two types of sleep	C2				
	• Describe the basic theories of sleep in detail	C1				
	• Explain physiological effects of sleep	C2				
	• Describe sleep and wakefulness cycle	C1				
EEG and epilepsy	• Describe brain waves	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 275) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 42) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 1209) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 756)	https://www.webmd.com/epilepsy/guide/types-epilepsy https://youtu.be/T7MKlPYiL48
	• Enumerate different types of brain wave	C2				
	• Explain the origin of different brain waves	C2				
	• Describe EEG	C1				
	• Define epilepsy	C1				
	• Enumerate various types of epilepsy	C1				
	• Explain various types of epilepsy	C2				
	• Describe role of nor-epinephrine, serotonin and	C1				
	• dopamine in psychotic disorders	C1				
	• Describe the causes, symptoms & treatment of depression & bipolar disorder	C1				
	• Discuss causes, types, symptoms and treatment of schizophrenia	C2				
	• Define Alzheimer's disease. Mention its causes, clinical features, incidence and	C1				

	treatment					
Introduction to motor nervous system & Reflex action Conditioned reflexes & properties Properties of reflex action Control of spinal cord reflexes by higher centers	• Outline brief introduction of motor nervous system	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of MedicalPhysiology.25TH Edition. Section 02 • (Chapter 12, Page 237,240) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. • Section 09.(Chapter 56, Page 697)	https://www.physio-pedia.com/Extrapyramidal_and_Pyramidal_Tracts https://youtu.be/B88BNYWVkWE
	• Give concept of cortical & subcortical motor control	C1				
	• Briefly explain UMN, LMN, anterior motor neurons & interneurons	C2				
	• Define reflex action	C1				
	• Define and draw reflex arc	C1				
	• Enumerate components of reflex arc	C1				
	• Classify the reflexes	C2				
	• Define conditioned reflex	C1				
	• Enlist and describe properties of conditioned reflexes	C1				
	• Give examples of conditioned reflex	C1				
	• Enlist and Explain properties of reflex action	C1,C2				
	• Compare & contrast spinal animal with decerebrate animal	C2				
	• Describe organization of spinal cord for motor functions	C1				
	• Explain the concept of cortical & subcortical control. • Define UMN & LMN	C2				
Introduction to cerebellum Neuronal circuits of cerebellum Cerebellum and its motor functions	• Describe physiological anatomy of cerebellum	C1	LGIS	MCQ SEQ VIVA		
	• Classify the functional parts of cerebellum & mention their functions	C2				
	• Describe neuronal circuits of cerebellum in detail	C1				
	• Enumerate the afferent and efferent pathways	C1				
	• Describe the functional unit of cerebellar cortex & deep cerebellar nuclei	C1				
	• Explain the role of purkinje cell, Deep nuclear cells and inhibitory cells of cerebellum in overall functions of cerebellum	C2				
	• Explain role of climbing fibers	C2				
	• Discuss the turn-on and turn-off mechanism	C2				
	• Enlist and explain motor functions of cerebellum	C1				

	• Explain the role of vestibulo cerebellum, spino cerebellum & neocerebellum in overall motor control by cerebellum	C2				
Muscle spindle & Golgi tendon organ Role of muscle spindle and Golgi tendon organ in voluntary motor activity	• Describe muscle spindle & Golgi tendon organ in detail	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 229,234) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 68, Page 476) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 55, Page 686,691)	https://www.osmosis.org/learn/Muscle_spindles_and_golgi_tendon_organs https://youtu.be/CzeAcc39Cyo
	• Explain the receptor function of the Muscle Spindle & Golgi tendon organ	C2				
	• Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation	C1				
	• Explain the dynamic and static response of muscle spindle & Golgi tendon organ	C2				
	• Briefly describe muscle stretch reflex	C1				
	• Draw the neuronal circuitry of the stretch reflex	C1				
	• Explain the static and dynamic components of stretch reflex	C2				
	• Discuss the clinical applications of stretch reflex	C2				
	• Explain negative stretch reflex	C2				
	• Explain lengthening reaction and its significance	C2				
	• Describe role of muscle spindle and Golgi tendon organ in voluntary muscle activity	C1				
	• Explain the role of alpha gamma co activation	C2				
Manifestations of cerebellar disease	• Enlist and explain clinical abnormalities of cerebellum	C2	LGIS	MCQ SEQ VIVA		
Polysynaptic reflexes Transection of spinal cord Role of brain stem in controlling motor functions Lesions of motor system	• Enlist polysynaptic reflexes	C1	LGIS	MCQ SEQ VIVA		
	• Describe the polysynaptic reflexes	C1				
	• Explain mechanism of reciprocal inhibition and reciprocal innervation	C2				
	• Enlist and describe reflexes of posture and locomotion	C1				
	• Explain scratch reflex	C2				
	• Enumerate the spinal cord reflexes that cause muscle spasm	C1				
	• Enlist autonomic reflexes in the spinal cord	C1				
	• Briefly describe transection of spinal cord	C1				

	• Explain stages of complete transection	C2				
	• Briefly explain stages of complications in complete transection of spinal cord	C2				
	• Describe hemi section of spinal cord	C1				
	• Explain brown-sequard syndrome	C1				
	• Enumerate and explain role of brainstem in controlling motor function	C1,C2				
	• Explain role of pontine & medullary reticular nuclei	C2				
	• Briefly write role of vestibular nuclei in antigravity muscle control	C1				
	• Summarize decerebrate rigidity	C1				
	• Enlist the effects of damage to specialized areas of motor cortex	C1				
	• Differentiate UMN Lesion and LMN Lesion	C2				
	• Explain decorticate rigidity	C2				
	• Briefly explain the pathophysiology of syringomyelia, tabs- dorsalis & poliomyelitis	C2				
Motor cortex & physiological importance of neocortex Corticospinal or pyramidal tract Extra pyramidal system	• Briefly describe motor areas in cortex	C1	LGIS	MCQ SEQ VIVA	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 243) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 57, Page 720)	• https://youtu.be/hxvep2Y8ShI https://www.sciencedirect.com/science/article/pii/S2214751923000026 https://teachmeanatomy.info/neuroanatomy/structures/basal-ganglia
	• Draw motor & somatic association areas of motor cortex	C1				
	• Explain functions of motor & somatic association areas	C2				
	• Explain allocortex & neocortex	C2				
	• Describe medial and lateral descending pathways	C1				
	• Explain transmission of signals from motor cortex to muscle	C2	LGIS	MCQ SEQ VIVA		
	• Draw course of pyramidal tract	C1				
	• Enlist the functions of pyramidal tract	C1				
	• Mention the effects of lesions in Corticospinal tract	C1				
	• Briefly describe extra pyramidal descending tracts	C1				
	• Describe rigidity and spasticity	C1				
	• Describe location and function of red nucleus	C1				
	• Describe physiological anatomy of basal ganglia	C1				

Basal Ganglia & Lesions	• Draw neuronal circuits of basal ganglia	C1				
	• Explain the role of neuronal circuits in functioning of basal ganglia	C2				
	• Enlist and explain the physiological role of neurotransmitters in basal ganglia system	C1				
	• Enumerate the clinical abnormalities caused by damage to basal ganglia	C1				
	• Briefly explain Parkinson disease regarding its causes, signs and symptoms & treatment	C2				
	• Explain Huntington's Chorea regarding its causes, signs and symptoms	C2				

Biochemistry Large Group Interactive Session (LGIS)

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglyceride Metabolism, Fatty acid transport	• Describe synthesis & breakdown of TAGs and factors affecting it	C2	LGIS	MCQs SAQs Viva
	• Explain entry of fatty acid into mitochondria (carnitine shuttle)	C2		
Oxidation of fatty acid	• Describe steps, enzymes, energy calculations of β- oxidation of saturated fatty acid (Odd + Even)	C2	LGIS	MCQs SAQs Viva
Oxidation of fatty acid	• Discuss other types of oxidations and related disorders	C2	LGIS	MCQs SAQs Viva
Fatty acid synthesis	• Explain the steps, regulation and related diseases of fatty acid synthesis	C2	LGIS	MCQs SAQs Viva
Cholesterol Synthesis	• Describe the steps, regulation and related disorders of Cholesterol Synthesis	C2	LGIS	MCQs SAQs Viva
Plasma Cholesterol level	• Recall normal Plasma Cholesterol level and factors controlling it	C1	LGIS	MCQs SAQs

				Viva
Ketone bodies metabolism	• Explain the synthesis and breakdown of Ketone bodies with related diseases (ketoacidosis)	C2	LGIS	MCQs SAQs Viva
Metabolism of Glycerophospholipid	• Describe the steps of biosynthesis of Glycerophospholipids with its regulation and clinical significance	C2	LGIS	MCQs SAQs Viva
Metabolism of Sphingophospholipids	• Explain the steps of biosynthesis of sphingophospholipids with its regulation and clinical significance	C2	LGIS	MCQs SAQs Viva
Introduction to Lipoproteins	• Discuss the functions and roll of Lipoproteins & apolipoprotein	C2	LGIS	MCQs SAQs Viva

LDL& HDL	• Explain the composition, functions and clinical significance of LDL& HDL	C2	LGIS	MCQs SAQs Viva
	• Illustrate the mechanism of reverse cholesterol transport	C3		
Disorders of lipoprotein metabolism	• Classify and explain the disorders of lipoprotein metabolism. • (hyper & hypo lipoproteinemia)	C2	LGIS	MCQs SAQs Viva
Fatty Liver & Adipose Tissue	• Interpret conditions leading to Fatty liver	C3	LGIS	MCQs SAQs Viva
	• Describe metabolism of adipose tissue & Brown fat	C2		
Disorders of lipoprotein metabolism	• Classify and explain the disorders of lipoprotein metabolism. • (hyper & hypo lipoproteinemia)	C2	LGIS	MCQs SAQs Viva

Anatomy Small Group Discussion (SGDs)

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Anterior & Middle cranial fossae	• Identify and describe the boundaries of anterior and middle cranial fossae	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Discuss anatomical features present in anterior and middle cranial fossa	C2		
	• Locate foramina and describe the structures passing through them	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Posterior cranial fossa	• Identify and describe the boundaries of posterior cranial fossa	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Discuss anatomical features present in posterior cranial fossa	C2		
	• Locate foramina and describe the structures passing through them	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Meninges, Dural venous sinuses, and intracranial hemorrhages	• Identify and describe meninges and their reflections on specimens and models	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Describe the attachments and relations of dural venous sinuses of brain with the help of models and specimens	C2		
	• Discuss the clinical importance of facial vein connection with dural venous sinuses.	C3		
	• Differentiate between various types of intracranial hemorrhages	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
	• Differentiate between different types of headaches	C3		

Spinal cord	• Describe the internal and external structure of spinal cord	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Compare the arrangement of white and gray matter in different regions of the spinal cord	C2		
	• Enumerate the major ascending and descending tracts of spinal cords	C1		
	• Illustrate the arrangements of ascending and descending tracts in the spinal cors	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Ascending tracts and their clinicals	• List the ascending tracts of the spinal cord	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Tabulate the sensation, receptor, first to third order neurons, pathways and destinations	C2		
	• Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts	C2		
	• Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts	C2		
	• Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Descending tracts and their clinicals	• List the descending tracts of the spinal cord	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Tabulate the sensation, receptor, first to third order neurons, pathways and destinations of pyramidal and extrapyramidal tracts	C2		
	• Describe and illustrate the pathways of corticospinal tracts	C2		
	• Describe and illustrate the pathways of extrapyramidal tracts	C2		
	• Describe the anatomical basis of the signs and symptoms in lesions of upper and lower motor neuron lesions	C3		

	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Lesions of Spinal Cord	• Explain anatomical basis of signs and symptoms of anterior and posterior nerve root lesions	C3	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Explain anatomical basis of signs and symptoms of complete cord transection syndrome, central cord syndrome, syringomyelia, anterior cord syndrome, Brown-Sequard Syndrome, Poliomyelitis and amyotrophic lateral sclerosis	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Medulla oblongata	• Identify and describe gross features of medulla and identify them on gross specimen/model.	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Identify and describe internal structure of medulla on cross sectional diagrams.	C2		
	• Describe the anatomical basis and clinical features of raised pressure in posterior cranial fossa, Arnold Chiari malformation, lateral and medial medullary syndrome.	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Pons & the Fourth ventricle	• Identify and describe the gross features of Pons on a given specimen/model	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Identify and describe internal structure of pons on cross sectional diagrams.	C2		
	• Describe the boundaries and relations of 4th ventricle	C2		
	• Describe the anatomical basis of clinical features of tumors, hemorrhage and infarctions of pons	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		

	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Midbrain & Cerebral aqueduct	• Identify and describe the gross features of Pons on a given specimen/model	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Identify and describe internal structure of pons on cross sectional diagrams.	C2		
	• Describe the boundaries and relations of 4th ventricle	C2		
	• Describe the anatomical basis of trauma, cerebral aqueduct stenosis and vascular lesions of midbrain.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cerebellum	• Identify and describe the gross features of cerebellum	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Describe internal structure of gray and white matter of cerebellar cortex	C2		
	• Describe the cerebellar cortical mechanisms	C1		
	• Describe afferent and efferent fibers of cerebellum	C2		
	• Discuss the functions of cerebellum	C2		
	• Describe the anatomical basis of signs and symptoms of cerebellar diseases such as hypotonia, gait alteration, ataxia, dysdiadochokinesia, disturbances in reflexes, disturbances in ocular movement, disorders of speech	C3		
	• Describe the anatomical basis of signs and symptoms of cerebellar syndromes such as vermis syndrome and cerebellar hemisphere syndrome	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Thalamus, Epithalamus & Subthalamus	• Identify and describe the gross structure of thalamus, epithalamus and subthalamus	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions	C1		
	• Describe the anatomical basis for the lesions of thalamus, epithalamus and subthalamus such as thalamic pain and thalamic hand	C3		
	• Correlate with the clinical conditions & cross sections.	C3		

	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Hypothalamus and 3rd Ventricle	• Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Identify and describe the functions of tuber cinereum and mamillary bodies	C2		
	• Describe the various afferent and efferent connections of hypothalamic nuclei	C2		
	• Describe the anatomical basis for the lesions of hypothalamus and hypothalamic syndromes	C3		
	• Describe the boundaries and relations of the 3rd ventricle	C2		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cortical areas, Layers and Lesions of Cerebrum	• Identify and describe the gross features of cerebrum	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Identify the describe the lobes and subdivisions of cerebrum	C2		
	• Identify the sulci and gyri of cerebral cortex and describe their functions	C2		
	• Identify and describe the commissural, association and projection fibers present in the white matter of the brain.	C2		
	• Discuss the anatomical basis of lesions of internal capsule and alzheimer's disease	C3		
	• Discuss the anatomical basis of cerebral cortical lesions of the motor cortex, frontal eye field, motor & sensory speech areas, prefrontal cortex, sensory cortex and visual areas	C3		
	• Discuss the anatomical basis of schizophrenia and frontal lobectomy	C3		
	• Discuss the basis cerebral dominance, consciousness, persistent vegetative state, sleep and epilepsy.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		

Lateral Ventricle &CSF	• Describe the relations and boundaries of lateral ventricle	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Describe the formation of choroid plexus in ventricles	C2		
	• Explain the function, production, circulation, and absorption of cerebrospinal fluid	C2		
	• Explain the causes of overproduction and blockage of CSF	C2		
	• Discuss the anatomical basis of various types of hydrocephalus and papilledema.	C3		
	• Discuss the formation and clinical significance of blood brain barrier, blood CSF barrier and CSF Brain interface.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cranial nerves I,II,II,IV,VI	• Identify the nuclei and connections of CN I,II,II,IV,VI	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Trace the pathway and perform reflexes associated with of CN I,II,II,IV,VI	C2		
	• Describe the anatomical basis of lesions of visual pathway and ophthalmoplegias	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cranial nerves V,VII	• Identify the nuclei and connections of CN V,VII	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Trace the pathway and perform reflexes associated with of CN V,VII	C2		
	• Describe the anatomical basis of upper and lower motor neuron lesion of CN V and trigeminal neuralgia	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cranial nerves	• Identify the nuclei and connections of CN VIII-XII	C2		

VIII-XII	• Trace the pathway and perform reflexes associated with of CN VIII-XII	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex	C3		
	• Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Basal ganglia	• Enlist components of basal ganglia	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE VIVA
	• Discuss functions of basal ganglia	C2		
	• Describe the connections of basal ganglia	C2		
	• Discuss the anatomical basis of hypo and hyperkinetic disorders such as chorea, hemiballismus, Parkinson's disease and athetosis.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Limbic system & Reticular formation	• Enlist components and connections of limbic system	C1	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Discuss functions of limbic system	C2		
	• Describe the connections of limbic system	C2		
	• Enlist components of reticular system	C1		
	• Discuss functions of reticular system	C2		
	• Describe the connections of reticular system	C1		
	• Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		

Blood Supply of Brain and clinicals	• Describe the arterial supply of brain and spinal cord from internal carotid artery and vertebrobasilar systems	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Describe the circle of Willis along with its clinical significance	C2		
	• Describe the venous drainage of brain and spinal cord	C2		
	• Discuss the anatomical basis of signs and symptoms of cerebral vessel occlusions and spinal cord ischemias.	C3		
	• Correlate with the clinical conditions & cross sections & cross sections	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Radiological Imaging of CNS	• Identify and describe the appearance of different parts of brain in o Normal radiographs o MRI o CT scan	C2	Skills lab	• MCQs • SAQs • SEQ • OSPE • VIVA
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cross Sectional Anatomy	• Identify different structures of male pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge • Identify different structures of female pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge • Practice the principles of bioethics. • Apply strategic use of A.I in health care • Read a relevant research article •	C2 C2 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • SEQ • OSPE • VIVA

Physiology Small Group Discussion (SGDs)

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Objectives	Teaching Strategy	Assessment Tools
Synapse & Sensory Receptors	• Describe the general organization of nervous system	C1	LGIS	MCQ SEQ VIVA
	• Describe major levels of CNS functions	C1		
	• Briefly explain nerve fiber structure, classification & properties	C2		
	• Describe labeled line principle	C1		
	• Define synapse	C1		
	• Enumerate & compare types of synapses	C2		
	• Describe process of synaptic transmission	C1		
	• Enumerate the important neurotransmitters of nervous system	C1		
	• Enumerate & explain different types of sensory receptors according to function	C1	LGIS	MCQ SEQ VIVA
	• Enumerate & explain different types of sensory receptors according to location	C2		
	• Enlist various properties of sensory receptors	C1		
	• Describe mechanism of signal transduction & generation of receptor potential	C1		
	• Describe mechanism of adaptation of different types of receptors	C1		
	• Describe the properties of sensory receptors	C1		
	• Describe the types and characteristics of tactile receptors	C1		
	• Briefly explain the electrical events during neuronal excitation and inhibition	C2	LGIS	MCQ SEQ VIVA
	• Explain temporal and spatial summation	C1		
	• Enlist & explain various characteristics of synaptic transmission	C1		
	• Describe visceral pain and its causes	C1		
	• Define headache	C1		
	• Enlist the types of headache & their causes	C1		
	• Explain the analgesia system	C2		
	• Describe thermal receptors	C1		
	• Explain mechanism of excitation of thermal receptors	C2		
	• Describe transmission of thermal signals in nervous system	C1		

Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system	C1	LGIS	MCQ SEQ VIVA
	• Enumerate the functions of autonomic nervous system	C1		
	• Describe sympathetic and parasympathetic nervous system	C1		
	• Enumerate & explain their receptors, neurotransmitters & physiological effects	C1		
	• Describe physiological anatomy & effects of adrenal medulla	C1		
	• Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response	C2	LGIS	MCQ SEQ VIVA
	• Draw a table showing autonomic effects on various body organs	C1		
	• Briefly describe the pharmacology of autonomic nervous system	C1		
Introduction to motor nervous system & Reflex action Conditioned reflexes & properties Properties of reflex action Control of spinal cord reflexes by higher centers	• Outline brief introduction of motor nervous system	C1	LGIS	MCQ SEQ VIVA
	• Give concept of cortical & subcortical motor control	C1		
	• Briefly explain UMN, LMN, anterior motor neurons & interneurons	C2		
	• Define reflex action	C1		
	• Define and draw reflex arc	C1		
	• Enumerate components of reflex arc	C1		
	• Classify the reflexes	C2		
	• Define conditioned reflex	C1		
	• Enlist and describe properties of conditioned reflexes	C1		
	• Give examples of conditioned reflex	C1		
	• Enlist and Explain properties of reflex action	C1,C2		
	• Compare & contrast spinal animal with decerebrate animal	C2		
	• Describe organization of spinal cord for motor functions	C1		
	• Explain the concept of cortical & subcortical control. • Define UMN & LMN	C2		
	• Describe physiological anatomy of cerebellum	C1		MCQ
	• Classify the functional parts of cerebellum & mention their functions	C2		
	• Describe neuronal circuits of cerebellum in detail	C1		
	• Enumerate the afferent and efferent pathways	C1		

Introduction to cerebellum Neuronal circuits of cerebellum Cerebellum and its motor functions	• Describe the functional unit of cerebellar cortex & deep cerebellar nuclei	C1	LGIS	SEQ VIVA
	• Explain the role of purkinje cell, Deep nuclear cells and inhibitory cells of cerebellum in overall functions of cerebellum	C2		
	• Explain role of climbing fibers	C2		
	• Discuss the turn-on and turn-off mechanism	C2		
	• Enlist and explain motor functions of cerebellum	C1		
	• Explain the role of vestibulo cerebellum, spino cerebellum & neocerebellum in overall motor control by cerebellum	C2		
Muscle spindle & Golgi tendon organ Role of muscle spindle and Golgi tendon organ in voluntary motor activity	• Describe muscle spindle & Golgi tendon organ in detail	C1	LGIS	MCQ SEQ VIVA
	• Explain the receptor function of the Muscle Spindle & Golgi tendon organ	C2		
	• Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation	C1		
	• Explain the dynamic and static response of muscle spindle & Golgi tendon organ	C2		
	• Briefly describe muscle stretch reflex	C1		
	• Draw the neuronal circuitry of the stretch reflex	C1		
	• Explain the static and dynamic components of stretch reflex	C2		
	• Discuss the clinical applications of stretch reflex	C2		
	• Explain negative stretch reflex	C2		
	• Explain lengthening reaction and its significance	C2		
	• Describe role of muscle spindle and Golgi tendon organ in voluntary muscle activity	C1		
	• Explain the role of alpha gamma co activation	C2		
	• Enlist polysynaptic reflexes	C1	LGIS	MCQ SEQ VIVA
	• Describe the polysynaptic reflexes	C1		
	• Explain mechanism of reciprocal inhibition and reciprocal innervation	C2		
	• Enlist and describe reflexes of posture and locomotion	C1		
	• Explain scratch reflex	C2		
	• Enumerate the spinal cord reflexes that cause muscle spasm	C1		
	• Enlist autonomic reflexes in the spinal cord	C1		
	• Briefly describe transection of spinal cord	C1		
	• Explain stages of complete transection	C2		
	• Briefly explain stages of complications in complete transection of spinal	C2		

	cord			
	• Describe hemi section of spinal cord	C1		
	• Explain brown-sequard syndrome	C1		
	• Enumerate and explain role of brainstem in controlling motor function	C1,C2		
	• Explain role of pontine & medullary reticular nuclei	C2		
	• Briefly write role of vestibular nuclei in antigravity muscle control	C1		
	• Summarize decerebrate rigidity	C1		
	• Enlist the effects of damage to specialized areas of motor cortex	C1		
	• Differentiate UMN Lesion and LMN Lesion	C2		
	• Explain decorticate rigidity	C2		
	• Briefly explain the pathophysiology of syringomyelia, tabs- dorsalis & poliomyelitis	C2		
Motor cortex & physiological importance of neocortex Corticospinal or pyramidal tract Extra pyramidal system Basal Ganglia & Lesions	• Briefly describe motor areas in cortex	C1	LGIS	MCQ SEQ VIVA
	• Draw motor & somatic association areas of motor cortex	C1		
	• Explain functions of motor & somatic association areas	C2		
	• Explain allocortex & neocortex	C2		
	• Describe medial and lateral descending pathways	C1		
	• Explain transmission of signals from motor cortex to muscle	C2	LGIS	MCQ SEQ VIVA
	• Draw course of pyramidal tract	C1		
	• Enlist the functions of pyramidal tract	C1		
	• Mention the effects of lesions in Corticospinal tract	C1		
	• Briefly describe extra pyramidal descending tracts	C1		
	• Describe rigidity and spasticity	C1		
	• Describe location and function of red nucleus	C1		
	• Describe physiological anatomy of basal ganglia	C1		
	• Draw neuronal circuits of basal ganglia	C1		
	• Explain the role of neuronal circuits in functioning of basal ganglia	C2		
	• Enlist and explain the physiological role of neurotransmitters in basal ganglia system	C1		
	• Enumerate the clinical abnormalities caused by damage to basal ganglia	C1		
	• Briefly explain Parkinson disease regarding its causes, signs and symptoms & treatment	C2		
	• Explain Huntington‘s Chorea regarding its causes, signs and symptoms	C2		
Limbic system Functions of hypothalamus	• Describe the concept of limbic system	C1		
	• Describe physiological anatomy of limbic system	C1		

	• Enumerate and explain the roles of hippocampus, amygdala and limbic cortex	C1		
	• Describe physiological anatomy of hypothalamus	C1		
	• Enlist functions of hypothalamus	C1		

	• Explain role of hypothalamus in:
	  ○ Vegetative function
	  ○ Endocrine function Behavioral function
	• Reward and punishment function
		C2		

Biochemistry Small Group Discussion (SGDs)

Topic	At The End Of Tutorial Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglycerides & F.A. oxidation	• Explain the functions & uses of triglycerides and steps of oxidation of Fatty acids	C2	SGD	MCQs SAQs Viva
Fatty acid synthesis & cholesterol metabolism	• Describe the steps of fatty acid synthesis, cholesterol, their functions& clinical significance	C2	SGD	MCQs SAQs Viva
Ketone bodies & Phospholipids	• Describe the synthesis & breakdown of ketone bodies and factors affecting them.	C2	SGD	MCQs SAQs Viva
	• Describe the phospholipids synthesis & their functions	C2		
Lipoprotein (HDL)	• Explain HDL synthesis, its functions & clinical significance	C2	SGD	MCQs SAQs Viva
Lipoprotein (VLDL, LDL)	• Explain synthesis, functions & clinical significance of VLDL, LDL	C2	SGD	MCQs SAQs Viva

Anatomy Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Anterior And middle Cranial Fossa	• Identify and describe the boundaries of anterior and middle cranial fossae • Discuss anatomical features present in anterior and middle cranial fossa • Locate foramina and describe the structures passing through them	• Clinically Oriented Anatomy, 9th Edition, pg no. 840-861 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/article/10.1007/s00701-013-1937-0
Posterior cranial fossa Dural venous sinuses and intracranial hemorrhages	• Identify and describe meninges and their reflections on specimens and models • Describe the attachments and relations of dural venous sinuses of brain with the help of models and specimens • Discuss the clinical importance of facial vein connection with dural venous sinuses. • Differentiate between various types of intracranial hemorrhages • Differentiate between different types of headaches	• Clinically Oriented Anatomy, 9th Edition, pg no. 840-861, 884-885, 895 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://www.tandfonline.com/doi/abs/10.3109/02688699308995089
Meninges & Spinal cord	• Describe the internal and external structure of spinal cord • Compare the arrangement of white and gray matter in different regions of the spinal cord • Enumerate the major ascending and descending tracts of spinal cords • Illustrate the arrangements of ascending and descending tracts in the spinal cord	• Clinically Oriented Anatomy, 9th Edition, pg no. 132-139, 883, 890-891 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3
Ascending tracts & Descending tracts	• List the ascending tracts of the spinal cord • Tabulate the sensation, receptor, first to third order neurons, pathways and destinations • Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts • Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts • Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 131-182 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7

Medulla Oblongata, Pons& Cerebellum	• Identify and describe gross features of medulla and identify them on gross specimen/model. • Identify and describe internal structure of medulla on cross sectional diagrams. • Identify and describe the gross features of Pons on a given specimen/model • Identify and describe internal structure of pons on cross sectional diagrams. • Identify and describe the gross features of cerebellum • Describe internal structure of gray and white matter of cerebellar cortex • Describe the cerebellar cortical mechanisms	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 185-247 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-1-61779-779-8_13
Midbrain and Diencephalon	• Identify and describe the gross features of Pons on a given specimen/model • Identify and describe internal structure of pons on cross sectional diagrams. • Describe the boundaries and relations of 4th ventricle • Describe the anatomical basis of trauma, cerebral aqueduct stenosis and vascular lesions of midbrain.	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 209, 363-372 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8
Cerebrum & Ventricular system	• Identify and describe the gross structure of thalamus, epithalamus and subthalamus • Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions • Identify and describe the functions of tuber cinereum and mamillary bodies • Describe the relations and boundaries of ventricles • Describe the formation of choroid plexus in ventricles • Explain the function, production, circulation, and absorption of cerebrospinal fluid • Explain the causes of overproduction and blockage of CSF	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 249-277, 436-462 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/article/10.1007/BF00344224 • https://www.tandfonline.com/doi/full/10.1080/10255840701492118
Canial Nerves 1-7	• Identify the nuclei and connections of CN 1,2,3,4,& 6 • Trace the pathway and perform reflexes associated with of CN 1,2,3,4,& 6 • Describe the anatomical basis of lesions of visual pathway and ophthalmoplegias • Identify the nuclei and connections of CN 5 & 7	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 323-361 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315

	• Trace the pathway and perform reflexes associated with of CN 5 & 7 • Describe the anatomical basis of upper and lower motor neuron lesion of CN 5 and trigeminal neuralgia	
Cranial Nerves 8-12, Basal Ganglia, Limbic system and Reticular Formation	• Identify the nuclei and connections of CN 8-12 • Trace the pathway and perform reflexes associated with of CN 8-12 • Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex • Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves • Enlist components and connections of limbic system • Discuss functions of limbic system • Describe the connections of limbic system • Enlist components of reticular system • Discuss functions of reticular system • Describe the connections of reticular system • Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction	• Clinically Oriented Anatomy 9th Edition, pg no. 299-308, 310- 321, 323-361. • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315 • https://link.springer.com/book/10.1007/978-1-4615-1235-6

Physiology Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Pathways for transmitting somatic signals	• Classify somatic senses • Describe the sensory pathways for transmission of somatic sensations to central nervous system. • Enumerate sensations carried by dorsal column system and anterolateral system • Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system • Compare and contrast dorsal column medial lemniscal system and anterolateral system	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609) • https://youtu.be/432AD7JZnKE • https://www.osmosis.org/learn/Somatosensory_pathways
Somatosensory cortex & lesions of Somatosensory cortex	• Explain cortical mapping & association cortex • Describe lesions of somatosensory areas • Summarize role of thalamus in somatic sensations	• Textbook of Medical Physiology by Guyton & Hall.14th Edition.(Chapter 48,Page 603) • https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.htm

	• Interpret the importance of dermatomes	1 • https://teachmeanatomy.info/neuroanatomy/pathways/ascending-tracts-sensory/
Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system • Enumerate the functions of autonomic nervous system • Describe sympathetic and parasympathetic nervous system • Enumerate & explain their receptors, neurotransmitters & physiological effects • Describe physiological anatomy & effects of adrenal medulla	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 255,259) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous System(Chapter 02. Page 47,59) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 392) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 763,765) • . https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system • https://youtu.be/j9pUItHAAhs 7 https://youtu.be/7pGKa-1tSJw https://youtu.be/gBOAYgMxq-Q
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	• Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response • Draw a table showing autonomic effects on various body organs • Briefly describe the pharmacology of autonomic nervous system	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 264) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous • System(Chapter 02. Page 55) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 397) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 768) • https://youtu.be/7pGKa-1tSJw • https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system • https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system
,	• Describe briefly the physiological anatomy of cerebral blood flow • Explain cerebrospinal fluid system	• Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 113)

Blood brain barrier, Blood CSF Barrier, Lumber puncture	• Describe the CSF pressure, its • measurement by lumbar puncture, & hydrocephalus • Explain blood CSF barrier • & BBB • Describe brain edema	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 62, Page 777-784) • https://youtu.be/f9xi1Rf5m9w • https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier
Limbic system, Functions of hypothalamus	• Describe the concept of limbic system	• Textbook of Medical Physiology by Guyton & Hall.14th Edition • https://youtu.be/h3K9RfGw8sI • https://www.endocrineweb.com/endocrinology/overview-hypothalamus
Learning and memory	• Define memory & classify its various types • Describe role of synaptic inhibition and synaptic facilitation in memory Explain mechanism of short term, intermediate and long-term memory Describe mechanism of consolidation of memory Enumerate specific parts of brain involved in memory • Explain the role of each part	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 15, Page 283) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 112) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 09 Page 332) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 58, Page 735) • https://youtu.be/EqdsQDM5Fys • https://www.sciencedirect.com/topics/psychology/learning-and-memory
Concept of Association areas, Concept of Dominant and non-dominant cerebral hemispheres	• Draw association areas of brain • Describe association areas of brain regarding their physiological role • Explain briefly the clinical features, if • the association areas become damaged • Describe concept of dominant hemisphere • Enlist role of parietooccipito temporal cortex in non-dominant hemisphere	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. • Section 09.(Chapter 58, Page 727) • https://my.clevelandclinic.org/health/articles/23073-cerebral-cortex https://youtu.be/2Z425-CHY1c
Speech and aphasia	• Describe sensory and motor aspects of communication Define Wernicke's aphasia, Motor aphasia & Global aphasia • Explain Wernicke's aphasia, Motor aphasia & Global • aphasia • Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 15, Page 290,293) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 1211) • https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892

		• https://www.stroke.org.uk/what-is-aphasia/types-of-aphasia
EEG and epilepsy	• Describe brain waves • Enumerate different types of brain wave • Explain the origin of different brain waves • Describe EEG • Define epilepsy • Enumerate various types of epilepsy • Explain various types of epilepsy • Describe role of norepinephrine, serotonin and • dopamine in psychotic disorders • Describe the causes, symptoms & treatment of depression & bipolar disorder • Discuss causes, types, symptoms and treatment of • Schizophrenia • Define Alzheimer‘s disease. Mention its causes, clinical features, incidence and treatment	• Ganong’s Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 275) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 42) • Physiological Basis of Medical Practice by Best & Taylor’s.13th Edition. (Chapter 70, Page 1209) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 756) • https://www.webmd.com/epilepsy/guide/types-epilepsy https://youtu.be/T7MKlPYiL48
Reticular activating system and sleep	• Describe activating driving system of the brain Explain the reticular activating system Discuss the control of cerebral activity by signals from brain stem Explain neurohormonal system of the brain • Define sleep and enumerate types of sleep • Compare and contrast between two types of sleep Describe the basic theories of sleep in detail • Explain physiological effects • of sleep • Describe sleep and wakefulness cycle	• Ganong’s Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 269,272,278) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Sensory Physiology (Chapter 10 Page 344) • Physiological Basis of Medical Practice by Best & Taylor’s.13th Edition. (Chapter 70, Page 12031208) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 753) • https://youtu.be/TdGQvWAZ0Cs • https://www.physio-pedia.com/Reticular Formation
Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity	• Describe muscle spindle & • Golgi tendon organ in detail • Explain the receptor function of the Muscle Spindle & Golgi tendon organ • Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation	• Ganong’s Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 229,234) • Physiological Basis of Medical Practice by Best & Taylor’s.13th Edition. (Chapter 68, Page 476) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 55, Page 686,691) • https://www.osmosis.org/learn/Muscle_spindles_and_golgi_tendon_organs https://youtu.be/CzeAcc39Cyo

	• Explain the dynamic and static response of muscle spindle & Golgi tendon organ • Briefly describe muscle stretch reflex • Draw the neuronal circuitry of the stretch reflex • Explain the static and dynamic components of stretch reflex • Discuss the clinical applications of stretch reflex • Explain negative stretch reflex • Explain lengthening reaction and its significance • Describe role of muscle spindle and Golgi tendon organ in voluntary muscle • activity • Explain the role of alpha gamma co activation	
Motor cortex & physiological importance of neocortex, Corticospinal or pyramidal tract, Extra pyramidal system	• Briefly describe motor areas in cortex • Draw motor & somatic association areas of motor cortex • Explain functions of motor & somatic association areas • Explain allocortex & neocortex • Describe medial and lateral descending pathways • Explain transmission of signals from motor cortex to muscle • Draw course of pyramidal tract • Enlist the functions of pyramidal tract • Mention the effects of lesions in Corticospinal tract • Briefly describe extra pyramidal descending tracts • Describe rigidity and • spasticity • Describe location and function of red nucleus	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 • (Chapter 12, Page 237,240) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. • Section 09.(Chapter 56, Page 697) • https://www.physio-pedia.com/Extrapyramidal_and_Pyramidal_Tracts https://youtu.be/B88BNYWVkWE
Basal Ganglia & Lesions	• Describe physiological anatomy of basal ganglia • Draw neuronal circuits of basal ganglia • Explain the role of neuronal circuits in functioning of basal ganglia • Enlist and explain the physiological role of neurotransmitters in basal ganglia system • Enumerate the clinical abnormalities caused by damage to basal ganglia • Briefly explain Parkinson disease • regarding its causes, signs and symptoms & treatment • Explain Huntington's Chorea regarding its causes, signs and symptoms	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 243) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 57, Page 720) • https://youtu.be/hxvep2Y8ShI • https://www.sciencedirect.com/science/article/pii/S2214

		751923000026 https://teachmeanatomy.info/neuroanatomy/structures/basal-ganglia/

Biochemistry Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Chylomicron metabolism	• Describe synthesis of chylomicron, its breakdown and factors affecting it	• Lippincott Biochemistry Chapter. 18 page 253 https://www.ncbi.nlm.nih.gov/books/NBK305896/
HDL & LDL metabolism	• Explain composition functions and clinical significance of LDL & HDL • Illustrate mechanism of revise cholesterol synthesis	• Lippincott Biochemistry Chapter. 18 page 253 • https://www.alilamedicalmedia.com/-/g...
Fatty acid oxidation	• Describe steps enzymes energy calculation of Beta oxidation of saturated fatty acid	• Lippincott Biochemistry Chapter. 16 page 213 • https://ninjanerd.org
Synthesis &Interconversion of Ketone Bodies, Regulation of Ketogenesis, Ketolysis	• Explain synthesis and breakdown of ketone bodies and related disorders	• Lippincott Biochemistry Chapter. 27 page 411 • https://youtu.be/GuSqOsm3QV8
Synthesis of Cholesterol and its regulation	• Describe steps regulation and related disorders of cholesterol synthesis	• Lippincott Biochemistry Chapter. 18 page 244 • https://youtu.be/y9zsDFdMvZY

Histology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Ganglia	• Identify the microscopic features of ganglia	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of ganglia	C2		
	• List two points of identification	C1		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Peripheral nerve	• Identify the microscopic features of peripheral nerve on given histological slide	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of peripheral nerve	C2		
	• List two points of identification	C1		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Spinal cord	• Identify histological slide of spinal cord	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of spinal cord	C2		
	• List two points of identification	C1		
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
Cerebellum	• Identify the microscopic features of cerebellum	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of cerebellum	C2		
	• List two points of identification	C1		
	• Correlate with the clinical conditions & cross sections.	C3		

	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		

Physiology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools	References
Examination of sensory nervous system	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A, P			
	• Precautions	P			
	• Recall sensations transmitted by sensory pathways	C1			
	• Recall the effects of lesions of these pathways	C1			
Examination of motor nervous system	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Recall descending pathways & their functions	C1			
	• Recall effects of lesions of these pathways	C1			
Examination of cerebellar System	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Recall functions of cerebellum & effects of lesions of cerebellum/	C3			
Ophthalmoscopy	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Clinical Correlation	C1			

Determination of Eye field	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Clinical Correlation	C3			
Recording of body temperature	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Record oral, axillary & rectal temperature	C1			
	• Recall abnormalities of body temperature	C1			
Examination of superficial & deep reflexes	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Recall reflex arc	C1			
	• Recall effects of UMNL & LMNL on reflexes	C1			
Examination of 3rd, 4th & 6th cranial nerves	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Recall functions & pathways of various cranial nerves	C1			
	• Recall effects of lesions of cranial nerves	C1			
Examination of 5th, & 7th cranial nerves / Examination of 8th , 9th, 10, 11th, 12th cranial nerves	• Apparatus identification	C1	Skill lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail
	• Principle	C1			
	• Procedure	A,P			
	• Precautions	P			
	• Recall functions & pathways of various cranial nerves	C1			
	• Recall effects of lesions of cranial nerves	C1			

Biochemistry Practicals Skill Laboratory (SKL)

Topic	At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Color Test For Sterols	Perform Color test four sterols	P	Skill Lab	OSPE
Detection of Cholesterol Crystals	Perform cholesterol Crystals Deduction Test.	P	Skill Lab	OSPE
Estimation of serum TAGS	Perform triglyceride estimation	P	Skill Lab	OSPE
Estimation of Serum HDL	Perform HDL Estimation	P	Skill Lab	OSPE
Lipid Solubility & Acrolein test	Perform Lipid Solubility & Acrolein test.	P	Skill Lab	OSPE

SECTION - III

Basic and Clinical Sciences (Vertical Integration)

Content

- **CBLs**
- **PBLs**
- **Vertical Integration LGIS**

Case Based Learning Objectives (CBL)

Subject	Topic	At the End Of Lecture Students Should Be Able To	Learning Domain
Anatomy	• Cystic Astrocytoma of cerebellum	Apply basic knowledge of subject to study clinical case.	C3
	• Stroke	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• CVA	Apply basic knowledge of subject to study clinical case.	C3
	• Gullain Barr syndrome	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• IHD	Apply basic knowledge of subject to study clinical case.	C3
	• Respiratory Distress Syndrome	Apply basic knowledge of subject to study clinical case.	C3

Vertical Integration LGIS

Pathology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
Patterns of injury in nervous system	• Describe edema ,herniation and hydrocephalous	C2	LGIS	MCQ'S
	• Classify cerebrovascular diseases	C2		
	• Explain CNS trauma	C2		
	• Identify Congenital malformation	C1		
Diseases of myelin and neurodegenerative diseases	Students should be able to • describe the pathophysiology and histomorphology of Alzheimer's disease, Parkinson's Disease, Huntington's disease and Multiple sclerosis	C2	LGIS	MCQ'S
Meningitis	• Classify types of meningitis	C2	LGIS	MCQ'S
	• Enlist causes of meningitis	C1		
	• Describe lab diagnosis of meningitis	C2		
	• Enlist complication of meningitis	C2		

Pharmacology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to CNS Pharmacology	• List the major neurotransmitters in the CNS	C1	LGIS	MCQ
	• List the major classes of receptors for each of the primary neurotransmitters and their associated relevant disorders	C1		
	• Identify the special considerations associated with CNS drug delivery	C1		
	• Cite main drug groups acting on the CNS	C1		

Medicine

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Stroke	• Discuss pathophysiology, Blood supply of brain (Anterior and posterior Circulation), which part of brain supplied by various arteries, Physiology of brain pathways (Corticospinal and Corticobulbar pathways), Types of Stroke, clinical features, management	C1 C2	LGIS	MCQs
Spinal Cord and Peripheral Nervous system	• Various types of pathways and cells, Peripheral Nerves and neuromuscular junction, difference between upper and lower motor neurons, various types of Plegias (Paraplegia, Hemiplegia, Quadriplegia), Various types of neuropathies and myasthenia Gravis and discuss pathophysiology	C1 C2	LGIS	MCQs
Cerebellar Disorders	• Brain parts involved in Movement and Co-ordination, how movements are brought about, possible lesions and discuss pathophysiology, types of disorders, clinical features, management	C1 C2	LGIS	MCQs
Meningitis	• Define and discuss pathophysiology and discuss symptoms and signs	C1	LGIS	MCQs
	• Discuss the causes	C2		
	• Describe the management	C2		
Epilepsy and other convulsive disorders	• Define and discuss pathophysiology	C1	LGIS	MCQs
	• Discuss the causes	C2		

	• Describe the management	C2		
Encephalitis	• Define and discuss and discuss pathophysiology, symptoms and signs	C1	LGIS	MCQs
	• Discuss the causes	C2		
	• Describe the management	C2		

Surgery

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Brain tumors	• Classify Brain Tumors	C1	LGIS	MCQ
	• Outline clinical features of brain tumors. • Approach towards a SOL brain	C1		
Brain abscess	• Define Brain Abscess	C1	LGIS	MCQ
	• Outline clinical features of brain abscess	C1		
Head injury	• Define head injury	C1	LGIS	MCQ
	• Mechanism of Head injury	C1		
	• Clinical features of head injury	C1		
	• Glassgow coma Scale	C1		
Poly trauma Patient	• Define polytrauma	C1	LGIS	MCQ
	• Describe triage	C1		
	• ATLS Protocol	C1		

Obstetrics & Gynecology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Seizures during pregnancy(eclampsia/epilepsy)	• Enumerate common neurological disorders during pregnancy (eclampsia, epilepsy)	C1	LGIS	MCQs
	• Understand neurological changes leading to eclampsia and epilepsy	C1		
	• Understand the effects of epilepsy and anti-epileptic drugs on mother and fetus	C1		
	• Comprehend the principles of management of epilepsy during pregnancy	C1		

Pediatrics

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Meningitis	Scenario of a patient with fever & fits		LGIS	MCQs
	• Define meningitis.	C1		
	• Discuss Epidemiology &Pathophysiology	C1		
	• Discuss Etiological organisms at different ages	C1		
	• Discuss Clinical features	C1		
	• Discuss Diagnosis & Management	C1		
	• Discuss Complications & prognosis	C1		
	• Discuss Prevention of meningitis	C1		
Cerebral Palsy	• Scenario of a Cerebral Palsy patient		LGIS	MCQs
	• Student will be able to know			
	• Discus Brief anatomy of brain	C2		
	• Definition of cerebral palsy	C1		
	• Discuss Epidemiology	C2		
	• Discuss Etiology	C2		
	• Discuss Pathophysiology	C2		
	• Discuss Clinical presentation & anatomic classification of Cerebral Palsy	C2		

	• Discuss Associated problems	C2		
	• Discuss Management & Prevention	C2		
Polio	• Scenario of a patient with acute flaccid paralysis	C1	LGIS	MCQs
	• Student will be able to know	C1		
	• AFP definition	C1		
	• Discuss Etiology & Epidemiology of Polio	C2		
	• Discuss Pathogenesis	C2		
	• Discuss Clinical features	C2		
	• Discuss Management	C2		
	• Discuss Complications & sequel	C2		
	• Prevention – vaccination	C1		

Radiology

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Skull radio graph	• Interprat Normal Skull Radioghraph	C1	LGIS	MCQs
	• Discuss fractures and other diseases with their clinical significance	C2		
CT- scan brain	• Interpret normal anatomical structures	C2	LGIS	MCQs
MRI & CT Scan	• List some indications for contrast enhanced MRI and CT	C1	LGIS	MCQs
CT scan	• Discriminate between a subdural and epidural hematoma at CT (4) Describe imaging signs of a subarachnoid hemorrhage	C2	LGIS	MCQs

ENT

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Acoustic neuroma	• Recognize signs and symptoms of acoustic neuroma	C1	LGIS	MCQs

Ophthalmology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Chalazion	• Discuss in detail the clinical features and management	C2	LGIS	MCQs
Strabismus	• Discuss in detail the clinical features and management	C2	LGIS	MCQs

List of CNS Module Vertical Courses Lectures

Date/Day	Department	Time	Week	Topic Of Lectures	Teachers
29-07-2024 Monday	Pharmacology (LGIS)	11:20AM – 12:10 PM	1st Week	Introduction to CNS pharmacology	Dr. Omaima Asif (Even)
					Dr Arsheen (Odd)
02-08-2024 Friday	Pediatrics (LGIS)	08:00AM – 09:00 AM	1st Week	Meningitis	Dr. Mamoona Qudrat (Even)
					Dr. Tanzeela Rani (Odd)
03-08-2024 Saturday	Pathology (LGIS)	10:30AM – 11:20 AM	1st Week	Introduction to ANS ,Basic Characteristics of Sympathetic & Parasympathetic System	Dr. Nida Fatima (Even)
				Meningitis	Dr. Kiran Ahmad (Odd)
05-08-2024 Monday	Pathology (LGIS)	11:20AM - 12:10 PM	2nd Week	Patterns of injury in nervous system	Dr. Nida Fatima (Even)
					Dr Kiran Ahmad (Odd)
07-08-2024 Wednesday	Surgery (LGIS)	11:20AM - 12:10 PM	2nd Week	Spinal injury and Head injury	Dr. Soban Sarwar Gondal (Even)
					Dr. Usman Malik (Odd)
08-08-2024 Thursday	Radiology (LGIS)	10:30AM – 11:20 AM	2nd Week	Skull Radiograph	Dr Riffat (Even)
					Dr Saba (Odd)
09-08-2024 Friday	Medicine (LGIS)	08:00AM – 09:00 AM	2nd Week	Spinal cord and peripheral nervous system	Dr Javeria Malik (Even)
					Dr Riffat (Odd)
10-08-2024 Saturday	Gynecology &OBS (LGIS)	11:00AM – 12:10 PM	2nd Week	Seizures during pregnancy(eclampsia/epilepsy)	Dr Ismat Batool (Even)
					Dr Sadia Waheed (Odd)
17-08-2024 Saturday	Medicine (LGIS)	11:20AM – 12:10 PM	3rd Week	Cerebellar disorders	Dr Javeria Malik (Even)
					Dr Faran Maqbool (Odd)
19-08-2024 Monday	Surgery (LGIS)	10:30AM – 11:20 AM	4th Week	Management of hydrocephalus	Dr. Fraz Mehmood (Even)
					Dr. Ammad ul Haq (Odd)
19-08-2024 Monday	Medicine (LGIS)	11:20AM – 12:10 PM	4th Week	Epilepsy and other convulsive disorders	Dr Javeria Malik (Even)
					Dr Faran Maqbool (Odd)
21-08-2024 Wednesday	Medicine (LGIS)	11:20AM – 12:10 PM	4th Week	Encephalitis	Dr Javeria Malik (Even)
					Dr Faran Maqbool (Odd)
26-08-2024 Monday	Medicine (LGIS)	10:30AM – 11:20 AM	5th Week	Stroke	Dr Javeria Malik (Even)
					Dr Faran Maqbool (Odd)
28-08-2024 Wednesday	Radiology	10:30AM - 11:20 AM	5th Week	CT scan and MRI (Brain and Spinal Cord)	Dr Anum Zahoor (Even)
					Dr Faisal (Odd)
28-08-2024 Wednesday	Surgery (LGIS)	11:20AM – 12:10 PM	5th Week	Poly trauma patient	Dr. Fraz Mehmood (Even)
					Dr. Ali Tasaddaq (Odd)

SECTION – IV

Spiral Courses

Content

- **Longitudinal Themes**
    - **The Holy Quran Translation**
    - **Pak Studies/Islamiyat**
    - **Family Medicine**
    - **Behavioral Sciences**
    - **Biomedical Ethics**
    - **Early Clinical Exposure (ECE)**

Introduction to Spiral Courses

The Holy Quran Translation

A course of Islamic Studies provides students with a comprehensive overview of the fundamental aspects of Islam, its history, beliefs, practices, and influence on society and familiarize students with a solid foundation in understanding the religion of Islam from an academic and cultural perspective. Ethics, in integrated form will shape the core of the course to foster among students the universal ethical values promoted by Islam.

Bioethics

Biomedical ethics, also known as bioethics, is a field of study that addresses the ethical, social, and legal issues arising from medicine and the life sciences. It applies moral principles and decision-making frameworks to the practice of clinical medicine, biomedical research, and health policy. Biomedical ethics seeks to navigate the complex ethical dilemmas posed by advances in medical technology, research methodologies, and healthcare practices. Key areas of focus include patient rights and autonomy, confidentiality, informed consent, end-of-life care, resource allocation, and the ethics of genetic engineering, among others.

Biomedical ethics within medical universities plays a pivotal role in shaping the moral framework through which future healthcare professionals navigate the complex and often challenging decisions they will face in their careers. This critical discipline integrates ethical theories and principles with clinical practice, research, and healthcare policy, fostering a deep understanding of the ethical dimensions of medicine. By embedding biomedical ethics into the curriculum, Rawalpindi medical university equips students with the tools to critically analyze and address ethical dilemmas, ranging from patient confidentiality and informed consent to end-of-life care and the equitable distribution of healthcare resources.

This education goes beyond theoretical knowledge, encouraging students to apply ethical reasoning in practical scenarios, thus preparing them for the moral complexities of the medical field. Biomedical ethics also promotes a culture of empathy, respect, and integrity, ensuring that future medical practitioners not only excel in their technical skills but also uphold the highest ethical standards in patient care and research. Through seminars, case studies, and interdisciplinary collaborations, students are encouraged to engage in ethical discourse, reflecting on the societal impact of medical advancements and the responsibility of medical professionals to society. This foundational aspect of medical education cultivates a generation of healthcare professionals committed to ethical excellence, patient advocacy, and the pursuit of equitable healthcare for all.

Professionalism

Professionalism in medicine refers to the set of values, behaviors, and relationships that underpin the trust the public has in doctors and other healthcare professionals. It encompasses a commitment to competence, integrity, ethical conduct, accountability, and putting the interests of patients above one's own. Professionalism involves adhering to high standards of practice, including maintaining patient confidentiality, communicating effectively and respectfully with patients and colleagues, and continually engaging in self-improvement and professional development. It also includes a responsibility to improve access to high-quality healthcare and to contribute to the welfare of the community and the

betterment of public health. In essence, professionalism in medicine is foundational to the quality of care provided to patients and is critical for maintaining the trust that is essential for the doctor-patient relationship.

Rawalpindi Medical University emphasizes the importance of professionalism in medicine, integrating it throughout its curriculum to ensure that students embody the core values of respect, accountability, and compassion in their interactions with patients, colleagues, and the community. This focus on professionalism is designed to prepare students for the complexities of the healthcare environment, instilling in them a deep sense of responsibility to their patients, adherence to ethical principles, and a commitment to continuous learning and improvement. Through a combination of theoretical learning, practical training, and mentorship, RMU encourages its students to exemplify professionalism in every aspect of their medical practice. Workshops, seminars, and clinical rotations further reinforce these values, providing students with real-world experiences that highlight the importance of maintaining professional conduct in challenging situations. RMU's approach to professionalism not only shapes competent and ethical medical professionals but also contributes to the broader mission of improving healthcare standards and patient outcomes. By prioritizing professionalism, Rawalpindi Medical University plays a crucial role in advancing the medical profession and ensuring that its graduates are well-equipped to meet the demands of a rapidly evolving healthcare landscape with honor and integrity.

Communication Skills

Communication skill for health professionals involves the ability to effectively convey and receive information, thoughts, and feelings with patients, their families, and other healthcare professionals. It encompasses a range of competencies including active listening, clear and compassionate verbal and non-verbal expression, empathy, the ability to explain medical conditions and treatments in an understandable way, and the skill to negotiate and resolve conflicts. Effective communication is essential for establishing trust, ensuring patient understanding and compliance with treatment plans, making informed decisions, and providing holistic care. It directly impacts patient satisfaction, health outcomes, and the overall efficiency of healthcare delivery

At Rawalpindi Medical University (RMU), the development of communication skills is regarded as a fundamental aspect of medical education, recognizing its critical importance in enhancing patient care, teamwork, and interdisciplinary collaboration. RMU is dedicated to equipping its students with exceptional communication abilities, enabling them to effectively interact with patients, their families, and healthcare colleagues. The curriculum is thoughtfully designed to incorporate various interactive and experiential learning opportunities, such as role-playing, patient interviews, and group discussions, which allow students to practice and refine their communication skills in a supportive environment.

By integrating communication skills training throughout its programs, RMU not only enhances the interpersonal competencies of its future healthcare professionals but also contributes to improving the overall quality of healthcare delivery. Graduates from RMU are distinguished not just by their clinical expertise but also by their ability to connect with patients and colleagues, making them highly effective and compassionate practitioners.

Behavioral Sceinces

Behavioral sciences in medicine focus on understanding and addressing the psychological and social aspects of health and illness. This interdisciplinary field combines insights from psychology, sociology, anthropology, and other disciplines to enhance medical care and patient outcomes. It explores how behavior, emotions, and social factors influence health,

disease, and medical treatment. By incorporating behavioral science principles into medical practice, healthcare professionals can better understand patients' perspectives, improve communication, and promote positive health behaviors, ultimately contributing to more comprehensive and effective patient care.

Family Medicine

Family medicine is a medical specialty dedicated to providing comprehensive health care for people of all ages and genders. It is characterized by a long-term, patient-centered approach, building sustained relationships with patients and offering continuous care across all stages of life. It focuses on treating the whole person within the context of the family and the community, emphasizing preventive care, disease management, and health promotion.

The Family Medicine Curriculum at Rawalpindi Medical University (RMU) marks a significant stride towards holistic healthcare education, aiming to prepare medical graduates for the comprehensive and evolving needs of family practice. This curriculum is designed to offer a broad perspective on healthcare, focusing on preventive care, chronic disease management, community health, and the treatment of acute conditions across all ages, genders, and diseases. Emphasizing a patient-centered approach, the curriculum ensures that students develop a deep understanding of the importance of continuity of care, patient advocacy, and the ability to work within diverse community settings.

RMU's Family Medicine Curriculum integrates theoretical knowledge with practical experience. Students are exposed to a variety of learning environments, including community health centers, outpatient clinics, and inpatient settings, providing them with a well-rounded understanding of the different facets of family medicine. This hands-on approach is complemented by interactive sessions, workshops, and seminars that cover a wide range of topics from behavioral health to geriatric care, ensuring students are well-equipped to address the comprehensive health needs of individuals and families.

Artificial Intelligence

To realize the dreams and impact of AI requires autonomous systems that learn to make good decisions. Reinforcement learning is one powerful paradigm for doing so, and it is relevant to an enormous range of tasks, including robotics, game playing, consumer modeling and healthcare. This class will provide a solid introduction to the field of reinforcement learning and students will learn about the core challenges and approaches, including generalization and exploration. Through a combination of lectures, and written and coding assignments, students will become well versed in key ideas and techniques for RL. Assignments will include the basics of reinforcement learning as well as deep reinforcement learning — an extremely promising new area that combines deep learning techniques with reinforcement learning. In addition, students will advance their understanding and the field of RL through a final project.

Integrated Undergraduate Research Curriculum

The integrated undergraduate research curriculum (IUGRC) of RMU occupies a definite space in schedule of each of the five years in rational and incremental way. It has horizontal harmonization as well as multidisciplinary research work potentials. In the first-year teachings are more introductory & inspirational rather than instructional. The teachings explain what & why of research and what capacities are minimally required to comprehend research & undertake research. Some research dignitaries' lecture are specifically arranged

for sharing their experiences and inspiring the students. Students are specifically assessed through their individual compulsory written feedback (reflection) after the scheduled teachings end.

Entrepreneurship

Entrepreneurship is the process of designing, launching, and running a new business, which typically starts as a small enterprise offering a product, process, or service for sale or hire. It involves identifying a market opportunity, gathering resources, developing a business plan, and managing the business's operations, growth, and development.

Entrepreneurship in medical universities represents a burgeoning field where the innovative spirit intersects with healthcare to forge advancements that can transform patient care, medical education, and healthcare delivery. This unique amalgamation of medical expertise and entrepreneurial acumen empowers students, faculty, and alumni to develop groundbreaking medical technologies, healthcare solutions, and startups that address critical challenges in the health sector. By integrating entrepreneurship into the curriculum, Rawalpindi Medical university is not only expanding the traditional scope of medical education but also fostering a culture of innovation and problem-solving. This enables future healthcare professionals to not only excel in clinical skills but also in business strategies, leadership, and innovation management.

Such initiatives often lead to the creation of medical devices, digital health platforms, and therapeutic solutions that can significantly improve patient outcomes and make healthcare more accessible and efficient. Through incubators, accelerators, and partnerships with the industry, medical universities are becoming hotbeds for healthcare innovation, driving economic growth, and contributing to the broader ecosystem of medical research and entrepreneurial success.

Digital Literacy Module

Digital literacy means having the skills one needs to live, learn, and work in a society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices.

Early Clinical Exposure (ECE)

Early clinical exposure helps students understand the relevance of their preclinical studies by providing real-world contexts. This can enhance motivation and engagement by showing students the practical application of their theoretical knowledge. Early exposure allows students to begin developing essential clinical skills from the start of their education. This includes not only technical skills but also crucial soft skills such as communication, empathy, and professionalism. Direct interaction with patients early in their education helps students appreciate the complexities of patient care, including the psychological and social aspects of illness. Early exposure to various specialties can aid students in making informed decisions about their future career paths within medicine.

Early clinical experiences contribute to the development of a professional identity, helping students see themselves as future physicians and understand the responsibilities and ethics associated with the profession. This can help reduce the anxiety associated with clinical work by familiarizing students with the clinical environment. It can build confidence in

their abilities to interact with patients and healthcare professionals. Engaging with real-life clinical situations early on encourages the development of critical thinking and problem-solving skills, which are essential for medical practice. It helps bridge the gap between theoretical knowledge and practical application, leading to a more integrated and holistic approach to medical education. It allows students to observe and understand how healthcare systems operate, including the challenges and limitations faced in different settings.: Early patient interaction emphasizes the importance of patient-centered care from the outset, underscoring the importance of treating patients as individuals with unique needs and backgrounds. Practical experiences can enhance long-term retention of knowledge as students are able to connect theoretical learning with clinical experiences.: Early clinical experiences often involve working in multidisciplinary teams, which fosters a sense of collaboration and understanding of different roles within healthcare.

In summary, early clinical exposure in medical education is pivotal for the holistic development of medical students, providing them with a strong foundation of practical skills, professional attitudes, and a deep understanding of patient-centered care.

Behavioral sciences

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Emotions	• To be able to define emotions.	C1	LGIS	MCQs
	• To understand the neuroanatomy and neurochemistry of emotion way to deal with emotion	C2		
Memory	• To be able to outline the types of memory.	C2	LGIS	MCQs
	• To be able to explain the areas in brain responsible for memory storage and Retrieval	C2		

Biomedical Ethics

Topics	At the end of session students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Ethical dilemmas in healthcare practice involving breach in principle of autonomy	• Analyze ethical dilemmas in healthcare practice involving breach in principle of autonomy. • Explain what procedures adopted to maintain patient autonomy. • Identify situations in which doctor may have to take decisions in the best interest of the patients	C3 C2 C1	Short video demonstration on violation of Ethical principle of autonomy from suit CBEC Video resources	• Assignment based assessment involving real life case scenarios under aggregate Marks. (Internal Assessment) • Assignment to be uploaded on LMS
Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence	• Analyze ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Explain what procedures adopted to maintain the principle of beneficence and non-maleficence in challenging situations	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources	• Assignment based assessment involving real life case scenarios under aggregate Marks

	• Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of beneficence and non-maleficence		Students deliberations and reflections Reflective writing	(Internal Assessment) • Assignment to be uploaded on LMS
Ethical dilemmas practice involving breach in principle of justice	• Analyze ethical dilemmas in healthcare practice involving breach in principle of justice • Explain what procedures adopted to maintain the principle of justice in challenging situations • Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of justice	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	• Assignment based assessment involving real life case scenarios under aggregate Marks (Internal Assessment) • Assignment to be uploaded on LMS

Family Medicine

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Approach to a patient with headache	• Describe presenting complains of patients with Headache • Discuss complications of Headache • Describe initial treatment of patients with Headache • Know when to refer patient to consultant/ Hospital	C3	LGIS-1	MCQs

Early Clinical Exposure (ECE)

Rotation to Department of Medicine

Session	Learning Objectives	Teaching Strategy
I Cases of stroke	At the end of the session students will be able to • Observe and describe the different types of stroke, including ischemic and hemorrhagic strokes, and explain the pathophysiological changes that occur in the brain as a result of these conditions. • Discuss the major risk factors for stroke, such as hypertension, atrial fibrillation, and diabetes, and recognize the early clinical signs and symptoms using the FAST (Face drooping, Arm weakness, Speech difficulties, Time to call emergency services) mnemonic. • Describe the initial steps in the management of stroke, including the importance of rapid assessment and intervention, the role of imaging in diagnosis, and the basic treatment strategies for ischemic versus hemorrhagic stroke	• Bedside Teaching • Duration 1 hour • Conducted by senior faculty member of unit
II Paraplegia	• Outline the anatomical structures of the spinal cord and its functional relationship with the body, understanding how injuries or diseases affecting these areas can lead to paraplegia. • Discuss the various etiologies of paraplegia, including traumatic spinal cord injury, tumors, infectious diseases, and degenerative disorders, and explain the pathophysiological mechanisms that result in the loss of motor and sensory functions below the level of injury. • Describe the initial clinical assessment of a patient with suspected paraplegia, including the importance of a thorough neurological examination and the use of diagnostic imaging. They will also learn about the basic principles of acute management and the multidisciplinary approach needed for long-term rehabilitation.	• Bedside teaching • Duration 1 hour • Conducted by senior faculty member of unit
III	• Define a vegetative state and differentiate it from other conditions affecting consciousness, such as coma and minimally conscious states, based on clinical characteristics and brain activity.	• Bedside teaching • Duration 1 hrs

Vegetative state	• Identify and explain the various causes that can lead to a vegetative state, including traumatic brain injury, severe brain hypoxia, and major neurological diseases, and discuss the underlying pathophysiological changes in the brain. • Describe assessment techniques used to determine the extent of brain function, the typical medical care provided, and the ethical challenges involved in decisions about long-term care, including discussions on quality of life and end-of-life decisions.	• Conducted by senior faculty member of unit

Rotation to Department of Surgery/ Neurosurgery

Session	Learning Objectives	Teaching Strategy
I Head injury	At the end of the session students will be able to • Classify head injuries into major categories such as concussions, contusions, skull fractures, and intracranial hematomas, and understand the mechanisms that typically cause these injuries. • Recognize the immediate and delayed signs and symptoms of head injuries, including changes in consciousness, visible head trauma, cognitive impairments, and neurological deficits. • Describe the basic pathophysiological changes that occur in the brain following different types of head injuries, such as the cascading effects of brain swelling, the impact of blood-brain barrier disruptions, and neuronal damage. • Understand the initial steps in the assessment and management of a patient with a head injury, including maintaining airway, breathing, and circulation, the use of imaging modalities like CT scans to assess internal damage, and the criteria for when to escalate care to neurosurgical interventions.	• Bedside Teaching • Duration 1 hour • Conducted by senior faculty member of unit

II Nerve injuries	• Describe the basic anatomy of peripheral nerves and be able to classify nerve injuries according to severity, using the Sunderland and Seddon classification systems, which categorize injuries based on the extent of damage to nerve fibers and surrounding structures. • List the common causes of nerve injuries, including traumatic injuries (such as lacerations and avulsions), compression (from tumors or entrapment syndromes), and iatrogenic injuries (resulting from medical or surgical procedures). • Understand how to recognize the clinical manifestations of nerve injuries, such as loss of sensation, motor function, or autonomic dysfunction in the affected area, and how these symptoms correlate with the specific nerve damaged. • Discuss the initial steps in the management of nerve injuries, including the importance of a thorough neurological examination, the use of diagnostic tools like electromyography (EMG) and nerve conduction studies, and the principles guiding acute treatment and referral for possible surgical intervention.	• Bedside teaching • Duration 1 hour • Conducted by senior faculty member of unit
	• Define coma as a deep state of unconsciousness and distinguish it from other states such as vegetative state, minimally conscious state, and brain death by understanding the clinical and neurological criteria for each. • Explain the underlying pathophysiological mechanisms that can induce coma, including traumatic brain injuries, strokes, brain tumors, infections, and metabolic imbalances. They will also discuss the role of disruptions in the reticular activating system and cerebral cortex in the maintenance of consciousness. • Use the Glasgow Coma Scale (GCS) to assess the level of consciousness in a patient, interpreting scores to gauge the severity of the coma and potential outcomes. They will also identify other important clinical signs such as pupillary responses and motor reflexes that help differentiate the cause of coma. • Understand the initial diagnostic steps required when assessing a comatose patient, including neuroimaging, blood tests, and possibly lumbar puncture. They will also discuss the basic management principles aimed at preserving life and brain functions.	• Bedside teaching • Duration 1 hrs • Conducted by senior faculty member of unit

Rotation to Department of Radiology

Session	Learning Objectives	Teaching Strategy
I CT scan Brain • Normal • Stroke • Hemorrhage • Infarction	At the end of the session students will be able to • Recognize the normal anatomical structures visible on a CT scan of the brain, including the cerebral hemispheres, cerebellum, brainstem, ventricles, and major sulci and gyri. They will also understand the typical appearances of these structures in different slices (axial, coronal, and sagittal). • Identify the CT findings associated with ischemic and hemorrhagic strokes, including areas of hypodensity in ischemic stroke and hyper density in hemorrhagic stroke. They will understand the importance of timing in the imaging of stroke for optimal diagnosis and management. • Describe the key differences in appearance between brain hemorrhages and infarctions on CT scans. They will be able to describe the characteristics of hemorrhages (e.g., acute intracerebral hemorrhage appearing as a hyperdense area) and infarctions (e.g., loss of cortical definition and the appearance of infarcted areas as hypodense). • Interpret CT images in the context of clinical symptoms to make preliminary	• Bedside Teaching • Duration 1 hour • Conducted by senior faculty member of unit

	diagnoses and understand potential management strategies. This objective aims to integrate their radiographic findings with clinical reasoning to enhance their diagnostic acumen.	
II Hydrocephalus	• Define hydrocephalus as the abnormal accumulation of cerebrospinal fluid (CSF) within the ventricles of the brain. • Distinguish between the types of hydrocephalus, including communicating, non-communicating (obstructive), and ex-vacuo, and understand the mechanisms that lead to each type. • Identify the common causes of hydrocephalus, such as congenital malformations, infections, tumors, and traumatic injuries. • Discuss the pathophysiological changes that occur, focusing on the dynamics of CSF production, flow, and absorption. • Describe the clinical manifestations of hydrocephalus, which may vary by age and the rate of CSF accumulation. • Discuss the diagnostic tools used to identify hydrocephalus, primarily imaging techniques such as ultrasound in infants, CT scans, and MRIs. • Describe the treatment options available, including surgical interventions like ventriculoperitoneal shunt placement and endoscopic third ventriculostomy.	• Bedside teaching • Duration 1 hour • Conducted by senior faculty member of unit
III Brain atrophy	• Define brain atrophy as the loss of neurons and the connections between them, resulting in decreased brain	• Bedside teaching • Duration 1 hrs

	volume. They will differentiate between focal atrophy, which affects specific areas of the brain, and generalized atrophy, which involves a reduction in the size of multiple brain regions. • Identify the various causes of brain atrophy, including neurodegenerative diseases (such as Alzheimer's disease and Parkinson's disease), traumatic brain injuries, stroke, and infectious diseases. • Describe the signs and symptoms of brain atrophy, such as cognitive decline, memory impairment, changes in motor skills, and alterations in behavior or personality, depending on the areas of the brain that are affected. • Discuss the role of imaging studies, such as MRI and CT scans, in diagnosing brain atrophy, and how these images can be used to assess the extent and pattern of atrophy. • Discuss the management approaches aimed at slowing the progression of symptoms and improving quality of life, including pharmacological treatments and supportive therapies.	• Conducted by senior faculty member of unit
IV Brain Edema	• Define brain edema • Distinguish between the two main types of brain edema: cytotoxic edema, which involves fluid buildup within brain cells due to cellular injury, and vasogenic edema,. • Identify various causes of brain edema, including traumatic brain injury,	• Bedside teaching • Duration 1 hrs • Conducted by senior faculty member of unit

	ischemic stroke, infections, tumors, and toxic exposures. • Describe the clinical signs and symptoms of brain edema, which may include headache, nausea, vomiting, altered consciousness, and neurological deficits such as weakness or speech disturbances, depending on the severity and location of the edema. • Understand the diagnostic techniques used to identify brain edema, primarily imaging studies like CT and MRI scans • Discuss the management options available, including medical treatments to reduce swelling (such as corticosteroids and osmotic diuretics), surgical interventions to relieve pressure, and the importance of addressing the underlying cause of the edema.	
V Skull/ spine Fractures	• Classify the types of skull fractures (such as linear, depressed, diastatic, and basilar) and spine fractures (including compression, burst, flexion-distraction, and fracture-dislocation). • Describe the Pathophysiology of Skull and Spine Fractures: Students will explore the pathophysiological implications of these fractures, including potential complications such as intracranial hemorrhage from skull fractures and spinal cord injury from spine fractures. They will examine how the location and severity of the fracture impact neurological outcomes. • Identify the clinical manifestations associated with skull and spine fractures.	• Bedside teaching • Duration 1 hrs • Conducted by senior faculty member of unit

	For skull fractures, symptoms may include visible deformities, cerebrospinal fluid leakage from nose or ears, and neurological deficits. For spine fractures, symptoms can include pain, paralysis, loss of sensation, and autonomic dysregulation. • Understand the diagnostic procedures used to assess skull and spine fractures, primarily focusing on imaging techniques like X-rays, CT scans, and MRI. • Discuss initial management strategies, including stabilization, neurologic assessment, and when to refer for surgical intervention.	
VI MRI Brain/ Spine	• Describe the fundamental principles of MRI technology, including how magnetic fields and radio waves are used to create detailed images of the brain and spinal structures. • Enlist the key indications for using MRI over other imaging modalities, such as its superior ability to differentiate between soft tissues and its usefulness in diagnosing conditions like tumors, inflammatory diseases, and vascular anomalies. • Recognize normal anatomical structures of the brain and spine on MRI scans. • Identify common pathological findings, such as signs of herniated discs, spinal stenosis, brain tumors, multiple sclerosis plaques, and evidence of acute or chronic stroke.	• Bedside teaching • Duration 1 hrs Conducted by senior faculty member of unit

	• Develop skills in interpreting MRI features that are specific to neurological conditions, • Describe the safety considerations associated with MRI, including the importance of screening for contraindications like implanted metallic devices.	

List of CNS Module Spiral Courses Lectures

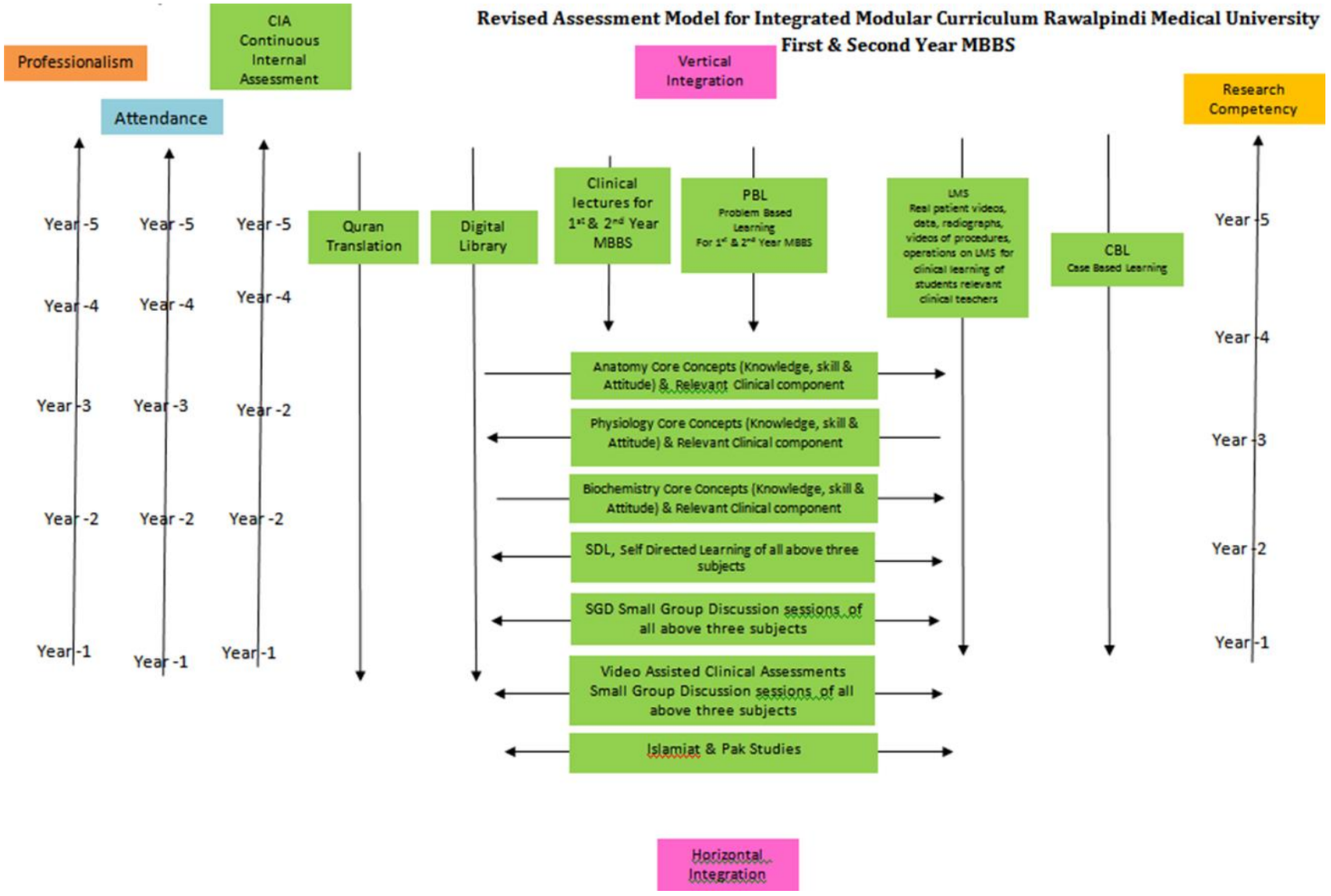
Date/Day	Department	Time	Week	Topic Of Lectures	Teachers
02-08-2024 Friday	Quran Translation	10:00AM – 11:00 AM	1st Week	Imaniyaat-5	Mufti Naeem Sherazi (Odd)
02-08-2024 Friday	Quran Translation	11:00AM – 12:00 PM	1st Week	Imaniyaat-6	Mufti Naeem Sherazi (Even)
09-08-2024 Friday	Quran Translation	10:00AM – 11:00 AM	2nd Week	Musawat	Mufti Naeem Sherazi (Even)
				Tehreek-e-Pakistan (1940-1947	Qari Aman Ullah (Odd)
09-08-2024 Friday	Quran Translation	11:00AM – 12:00 PM	2nd Week	Tehreek-e-Pakistan (1940-1947	Qari Aman Ullah (Even)
				Musawat	Mufti Naem Sherazi (Odd)
16-08-2024 Friday	Pakstudies/Islammiyat	10:00AM – 11:00 AM	3rd Week	Khwateen k hakook	Mufti Naem Sherazi (Odd)
				Qayam e Pakistan, ibtidaimushkilaat	Qari Aman Ullah (Even)
16-08-2024 Friday	Pakstudies/Islammiyat	11:00AM – 12:00 PM	3rd Week	Qayam e Pakistan, ibtidaimushkilaat	Qari Aman Ullah (Even)
				Khwateen k hakook	Mufti Naem Sherazi (Odd)
26-08-2024 Monday	Family Medicine (LGIS)	11:20AM – 12:10 PM	5th Week	Approach to a patient with neuronal disease	Dr. Sadia
27-08-2024 Tuesday	Behavioral Sciences (LGIS)	11:20AM – 12:10 PM	5th Week	Memory & Emotions	Dr. M. Azeem Rao (Even)
					Dr. Zarnain Umar (Odd)
29-08-2024 Thursday	Behavioral Sciences (LGIS)	11:20AM – 12:10 PM	5th Week	Metacognition	Dr. Zarnain Umar (Even)
					Dr. Ali Tasaddaq (Odd)
30-08-2024 Friday	Quran Translation IV	08:00AM – 09:00 AM	5th Week	Momalat-I	Mufti Naeem Sherazi (Odd)
	Quran Translation V	09:00AM – 10:00 AM		Momalat-II	Mufti Naeem Sherazi (Even)

SECTION - V

Assessment Policies

Contents

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in CNS Module**



Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 – 70%	71 – 80%	81 - 100%

60% and above is passing marks.

Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 – 74%	*75 – 80%	81 - 100%

90% is eligibility criteria for appearing professional examination.

Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular,modular and block levels.

Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3rd of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given theshare according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based),modular and block levels.

Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

Table 4-Assessment Frequency & Time in CNS Module

Block	Sr #	Module – 1 CNS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-II	1	Weekly LMS Based Assessments (Anatomy, Physiology & Biochemistry)	Formative	2 Hours	3 Hours 45 Minutes	3 Hours	2 Formative	6 Summative
	2	End Module Examinations (SEQ, SAQ, EMQ & MCQs Based)	Summative	2 Hours				
	3	Audio Visual (AV) OSPE (10 slides) 5 minutes per slide	Summative	50 Minutes				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures & Spiral Curriculums	Formative	60 Minutes				

Learning Resources

Subject	Resources
Anatomy	**A. Neuroanatomy** **1.** Snell's Clinical Neuroanatomy by Rayan Splittgerber 9th Edition. **B. Gross Anatomy** 2. Gray's Anatomy By Prof. Susan Standring 42th Edition, Elsevier. 3. Clinical Anatomy For Medical Students By Richard S.Snell 10th Edition. 4. Clinically Oriented Anatomy By Keith Moore 9th Edition. 5. Cunningham's Manual Of Practical Anatomy By G.J. Romanes, 16th Edition, Vol-I, Ii And Iii **C. Histology** 1. B. Young J. W. Health Wheather's Functional Histology 6th Edition. 2. Medical Histology By Prof. Laiq Hussain 7th Edition. **D. Embryology** 1. Keith L. Moore. The Developing Human 11th Edition. 2. Langman's Medical Embryology 14th Edition. **E. YouTube Links** 6. https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z 7. https://www.youtube.com/watch?v=Z3fLmpepJfg&list=PLmzZnYRTmRK8BTd1iJtzry0WhOYkpca0g 8. https://www.youtube.com/watch?v=q8NtmDrb_qo&pp=ygULY25zIGFuYXRvbXk%3D 9. https://www.youtube.com/watch?v=ADAOsuaOSCk&list=PLTF9h-T1TcJgx3OFachdjHPMX6VE4VDS1 **F. HEC Digital Library Links** 10. https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3 11. https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7 12. https://link.springer.com/chapter/10.1007/978-1-61779-779-8_13 13. https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8 14. https://link.springer.com/article/10.1007/s00701-013-1937-0 15. https://link.springer.com/article/10.1007/BF00344224 **G. Journal Links** 1. https://www.tandfonline.com/doi/abs/10.3109/02688699308995089 2. https://www.tandfonline.com/doi/full/10.1080/10255840701492118 3. https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315 1. https://link.springer.com/book/10.1007/978-1-4615-1235-6

Physiology	**A. Textbooks** 1. Textbook Of Medical Physiology by Guyton And Hall.14th edition 2. Ganong's Review of Medical Physiology.25TH Edition **B. Reference books** 1. Human Physiology by Lauralee Sherwood 10th edition. 2. Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. 3. Best & Taylor Physiological Basis of Medical Practice 13th edition. 4. Berne & Levy Physiology 7th edition. **C. Internet References** 1. https://www.ncbi.nlm.nih.gov/books/NBK539861/ 2. https://teachmephysiology.com/nervous-system/sensory-system/pain-pathways/ 3. https://www.osmosis.org/learn/Somatosensory_pathways 4. https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system 5. https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system **D. HEC Library** 1. https://www.sciencedirect.com/topics/neuroscience/synaptic-transmission 2. https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.html 3. https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier 4. https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 **E. Youtube links** 1. https://youtu.be/AG7Ev2hJGFk 2. https://youtu.be/cZwb8zqAPXc 3. https://youtu.be/5c8maFAhqIc 4. https://youtu.be/432AD7JZnKE 5. https://youtu.be/j9pUItHAAhs 6. https://youtu.be/7pGKa-1tSJw 7. https://youtu.be/gBOAYgMxq-Q 8. https://youtu.be/DPHoTIcFfLs **F. Journal of Physiology** 1. https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 2. https://www.sciencedirect.com/topics/psychology/learning-and-memory 3. https://www.physio-pedia.com/Reticular_Formation 4. https://www.sciencedirect.com/science/article/pii/S2214751923000026

Biochemistry	**A. Textbooks** 1. Harper's Illustrated Biochemistry 32th edition. 2. Lippincott's Illustrated Biochemistry 32th edition. 3. Lehninger Principle of Biochemistry 8th edition. 4.. Biochemistry by Devlin 7th edition. **B. Website** 1. https://www.alilamedicalmedia.com/-/g... 2. https://ninjanerd.org **C. Youtube** • https://youtu.be/GuSqOsm3QV8 • https://youtu.be/y9zsDFdMvZY **D. HEC Library and Journals** https://www.ncbi.nlm.nih.gov/books/NBK305896/

SECTION - VI

Time Table

Clinically Oriented Integrated Modular Curriculum for Second Year MBBS

CNS Time Table

Second Year MBBS

Session 2023 - 2024

Batch- 50

CNS Module Team

Module Name	:	CNS Module
Duration of module	:	06 Weeks
Coordinator	:	Dr. Arsalan Manzoor Mughal
Co-coordinator	:	Dr. Gaiti Ara
Reviewed by	:	Module Committee

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Director DME	Prof. Dr. Ifra Saeed
3.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar
5.	Chairperson Biochemistry	Dr. Aneela Jamil
6.	Focal Person Anatomy Second Year MBBS	Dr. Maria Tasleem
7.	Focal Person Physiology	Dr. Sidra Hamid
8.	Focal Person Biochemistry	Dr. Aneela Jamil
9.	Focal Person Pharmacology	Dr. Zunera Hakim
10.	Focal Person Pathology	Dr. Asiya Niazi
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom
13.	Focal Person Quran Translation Lectures	Dr. Uzma Zafar
14.	Focal Person Family Medicine	Dr. Sadia Khan

Module Task Force Team		
1.	Coordinator	Dr. Arsalan Manzoor Mughal (Associate Professor of Anatomy)
2.	DME Focal Person	Dr. Farzana Fatima
3.	Co-coordinator	Dr. Gaiti Aara ((APWMO of Anatomy)
4.	Co-Coordinator	Dr. Rahat (Senior Demonstrator of Biochemistry)
5.	Co-coordinator	Dr. Shazia (Senior Demonstrator of Physiology)

DME Implementation Team		
1.	Director DME	Prof. Dr. Ifra Saeed
2.	Assistant Director DME	Dr Farzana Fatima
3.	DME Implementation Team	Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz
4.	Editor	Muhammad Arslan Aslam

Discipline Wise Details of Modular Contents

Subjects	Embryology	Histology	General Anatomy	Gross Anatomy
• Anatomy	• Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Peripheral Nervous System	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System.	• Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS • Cross Sectional Anatomy of CNS
• Biochemistry	• Fatty acid metabolism • Cholesterol Metabolism • Ketone bodies metabolism • Lipoproteins and Phospholipids • Fatty Liver and hyper Lipidemias. • Glycerophospholipid & Sphimgo phospholipid			
• Physiology	• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain, Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture			

	• Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus • Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action, Conditioned reflexes & Properties of reflex action, Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity
Spiral Courses	
• The Holy Quran Translation	• Imaniyaat-5 • Imaniyaat-6 • Momalat-I • Momalat-II
• Pak Studies / Islammiyat	• Musawat • Tehreek-e-Pakistan (1940-1947) • Khwateen k hakook • Qayam e Pakistan, Ibtidai Mushkilaat
• Bioethics & Professionalism	• Ethical dilemmas in healthcare practice involving breach in principle of autonomy • Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Ethical dilemmas practice involving breach in principle of justice
• Radiology & Artificial Intelligence	• Skull radiograph • CT Scan & MRI
• Family Medicine	• Approach to a patient with headache
• Behavioral Sciences	• Emotions • Memory
Vertical Integration	
• Pharmacology	• Introduction to CNS
• Pathology	• Patterns of injury in nervous system • Meningitis
• Pediatrics	• Meningitis

	• Cerebral palsy, Polio
• Surgery	• Spinal injury and head injury • Management of hydrocephalus • Brain abscess • Polytrauma patient
• Medicine	• Spinal cord and peripheral nervous system • Encephalitis • Cerebellar disorders • Epilepsy and other convulsive disorders • Stroke
• Gynecology & Obs	• Seizures during pregnancy (eclampsia/ epilepsy)
Early Clinical Exposure	
• Medicine	• Cases of stroke • Paraplegia • Vegetative state
• Surgery/ Neurosurgery	• Head injury. • Nerve injuries
• Radiology	• CT scan • Brain • Normal • Stroke • Hemorrhage • Infarction Hydrocephalus • Brain atrophy • Brain Edema • Skull/ spine Fractures • MRI Brain/ Spine

Categorization of Modular Contents

Anatomy

Category A*	Category B**		Category C***			
Special Embryology	**Special Histology**	**General Anatomy**	**Demonstrations / SGD**	**CBL**	**Practical's**	**Self-Directed Learning (SDL)**
• Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Peripheral Nervous System • Development of Cranium	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System	• Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS • Cross Sectional Anatomy	• Cystic Astrocytoma of cerebellum • Stroke	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS

Category A*: By Professors

Category B:** By Associate & Assistant Professors

Category C*:** By Senior Demonstrators & Demonstrators

Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy Department	03
2.	Associate professor Of Physiology Department	02
	Assistant professor of Anatomy Department (AP)	01
3.	Demonstrators of Anatomy Department	04

Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	11*2 = 22 hours
2.	Small Group Discussions (SGD)	22*2= 44 hours
3.	Practical / Skill Lab	7.5*5= 37.5 hours

Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	1*11 = 11 hours
2.	Small Group Discussions (SGD)	2*22= 44 hours
3.	Practical / Skill Lab	1.5 *5 = 7.5 hours
4.	Self-Directed Learning (SDL)	2*10 = 20 hours

Physiology

Category A & B*	Category C***				
LGIS	**PBL**	**CBL**	**Practical's**	**SGD**	**SDL**
• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain,Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture • Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus • Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action,Conditioned reflexes & Properties of		1. CVA 2. Gullain Barr syndrome	**1.** Examination of sensory nervous system **2.** Examination of Motor System **3.** Examination of **4.** Cerebellar System **5.** Ophthalmoscopy E **6.** Determination of field of vision	1. Synapse & sensory Receptors 2. Autonomic Nervous System 3. Motor nervous system , muscle spindle and Golgi tendon organ 4. Motor Nervous System 5. Basal Ganglia & limbic system 6. Analgesia system 7. Cerebellum	**On Campus:** **1.** Sensory pathways for transmitting somatic signals **2.** Somatosensory cortex & lesions of Somatosensory cortex **3.** Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function **4.** Excitatory & inhibitory effects of sympathetic & parasympathetic **5.** stimulation **6.** CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture **7.** Limbic system, **8.** Functions of hypothalamus **Online:** **9.** Learning and memory **10.** Concept of Association areas, Concept of Dominant and nondominant cerebral hemispheres **11.** Speech and aphasia **12.** EEG and epilepsy **13.** **14.** Reticular activating system and sleep **15.** Muscle spindle & Golgi tendon organ, Role of muscle spindle and **16.** Golgi tendon organ in voluntary motor activity **17.** Motor cortex & physiological importance of neocortex,

reflex action,Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, • and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity • Manifestations of cerebellar disease • Polysynaptic reflexes & Transection of spinal cord, • Role of brain stem in controlling motor functions & Lesions of motor system • Motor cortex & physiological importance of neocortex, Corticospinal or pyramidal tract, Extra pyramidal system • Basal Ganglia & Lesions					**18.** Corticospinal or pyramidal tract, Extra pyramidal system **19.** Basal Ganglia & Lesions **Off Campus:** 1. Organization of nervous system 2. Classification of sensory receptors 3. Sensory pathways for transmitting somatic signals 4. Physiology of pain, Dual 5. pathway for 6. transmission of pain, 7. CSF, Blood brain barrier, Blood CSF Barrier, 8. Lumber puncture 9. Muscle spindle & 10. Golgi tendon organ, 11. Hypothalamus 12. Properties of reflex 13. action, Control of spinal cord 14. reflexes by higher centers 15. Reticular activating system 16. and sleep, EEG and epilepsy 17. Introduction to cerebellum, 18. Neuronal circuits of cerebellum 19. Basal Ganglia & Lesions

Category A*: By Professors

Category B:** By Associate & Assistant Professors

Category C*:** By Senior Demonstrators & Demonstrators

Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / HumanResource	Total number ofteaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	08

Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	1 x 22= 22 x 1 hour = 22 hours
2.	Small Group Discussions (SGD)/CBL	25 x 1.5 hour = 37.5+2= 39.5 hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	25 x 1.5 hour = 37.5 hours
5.	Self-Directed Learning (SDL)	oncampus14 x 1 hour = 14 hours off campus 11x1 = 11 hours

Biochemistry

Category A & B	Category C***			
LGIS	**PBL**	**CBL**	**Practical's**	**SGD**
• Triglyceride Metabolism, Fatty acid transport • Oxidation of fatty acid • Oxidation of fatty acid • Fatty acid synthesis • Cholesterol Synthesis • Plasma Cholesterol level • Ketone bodies metabolism • Biosynthesis of Glycerophospholipid • Biosynthesis of sphingophospholipids • Introduction to Lipoproteins • LDL& HDL • Disorders of lipoprotein metabolism • Fatty liver & Adipose tissues • Disorders of lipoprotein metabolism		• IHD • Respiratory Distress Syndrome	• Color Test for Sterols • Detection of Cholesterol Crystals • Estimation of serum TAGS • Estimation of Serum HDL • Lipid Solubility & Acrolein test	• Triglycerides & F.A. oxidation • Fatty acid synthesis & cholesterol metabolism • Ketone bodies & Phospholipids • Lipoprotein (HDL) • Lipoprotein (VLDL, LDL)

***:** Assistant Professor (HOD) and APMO (With Postgraduate Qualification)

Category B:** (Senior Demonstrators & APWMO)

Category C*:** (By All Demonstrators, Senior Demonstrators and APWMO)

Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	01
2	Demonstrators of biochemistry department	06

Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (Lectures)	2 * 5 = 10 hours	05
2.	Small Group Discussions (SGD)	7.5 * 7 = 37.5 hours	7.5
3.	Problem Based Learning (PBL)	2*1= 2 hours	2
4.	Practical / Skill Lab	7.5 * 5 = 37.5 hours	7.5
5.	Self-Directed Learning (SDL)	--------	05

Second Year Timetable for CNS Module (First Week)
(29-07-2024 To 03-08-2024)

Date/Day	8:00am-9:20am	9:20am – 10:10am	10:10am – 10:30am	10:30am-11:20am	11:20am-12:10pm	12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignments
29-07-2024 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Organization of nervous system, Mechanism of synaptic transmission | Classification of sensory receptors &Properties of sensory receptors Dr. Faizania (Even) | Prof. .Dr. Samia / Dr. Kamil(Odd)	Break	**ANATOMY (LGIS)** General Anatomy Nervous system | Embryology Early development of CNS Assoc. Prof. Dr. Arsalan Manzoor (Even) | Prof. Dr. Ifra Saeed (Odd)	**SDL**	Break	**SGD / DISSECTION** Anterior and Middle Cranial Fossa	SDL Physiology Organization of nervous system, Mechanism of synaptic transmission
30-07-2024 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Classification of sensory receptors &Properties of sensory receptors | Organization of nervous system, Mechanism of synaptic transmission Prof. Dr. Sami Sarwar/ Dr. Kamil (Even) | Dr. Fazania(Odd)		**ANATOMY (LGIS)** Embryology Early development of CNS | General anatomy Nervous system Prof. Dr. Ifra Saeed (Even) | Assoc. Prof .Dr. Arsalan Manzoor (Odd)	**PBL 1 (SESSION-I)** PBL Team		**SGD / DISSECTION** Posterior cranial fossa	SDL Physiology Classification of sensory receptors
31-07-2024 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Properties of synaptic transmission | Physiology of Pain, dual Pathway for Transmission of pain, Analgesia system and thermal sensation Dr. Fazania (Even) | Prof.. Dr. Samia / Dr. Kamil (Odd)		**ANATOMY (LGIS)** Embryology Development of Spinal Cord | General Anatomy Autonomic Nervous System Prof. Dr. Ifra Saeed (Even) | Assoc. Prof .Dr. Arsalan Manzoor (Odd)	**BIOCHEMISTRY (LGIS)** Triglyceride Metabolism Transport | Introduction to Lipoproteins, chylomicrons, VLDL Metabolism Dr. Aneela (Even) | Dr. Kashif (Odd)		**SGD / DISSECTION** Meninges, Dural venous sinuses and intracranial hemorrhages	SDL Biochemistry Chylomicron Metabolism
01-08-2024 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Physiology of Pain, dual Pathway for Transmission of pain, Analgesia system and thermal sensation | Properties of synaptic transmission Prof.. Dr. Samia / Dr. Kamil (Even) | Dr. Faizania (Odd)		**ANATOMY (LGIS)** General anatomy Autonomic Nervous system | Embryology Development of Spinal Cord Assoc. Prof. Dr. Arsalan Manzoor (Even) | Prof. Dr. Ifra Saeed (Odd)	**BIOCHEMISTRY (LGIS)** Introduction to Lipoproteins, chylomicrons, VLDL Metabolism | Triglyceride Metabolism Transport Dr. Kashif (Even) | Dr. Aneela (Odd)		**SGD / DISSECTION** Spinal Cord	SDL Anatomy Posterior cranial fossa Dural venous sinuses and intracranial hemorrhages
02-08-2024 Friday	**8:00am-900am** **PEDIATRICS** Meningitis Dr. Mamoona Qudrat(Even) | Dr. Tanzeela Rani(Odd)	**9:00am-10:00am** **PHYSIOLOGY (LGIS)** Sensory Pathways for transmitting Somatic Signals | Introduction to AN, Basic Characteristics of Sympathetic & Parasympathetic Dr. Fahd (Even) | Dr Uzma (Odd)		**10:00am-11:00am** **QURAN TRANSLATION** Imaniyaat-5 Mufti Naeem Sherazi (Odd)	**11:00am-12:00pm** **QURAN TRANSLATION** Imaniyaat-6 Mufti Naeem Sherazi (Even)			
03-08-2024 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Introduction to ANS ,Basic Characteristics of Sympathetic & Parasympathetic | Sensory Pathways for transmitting Somatic Signals Dr. Uzma (Even) | Dr. Fahd (Odd)	Break	**PATHOLOGY** Introduction to ANS ,Basic Characteristics of Sympathetic & Parasympathetic System | Meningitis Dr. Nida Fatima (even) | Dr. Kiran Ahmad (odd)	**PBL 1 (SESSION-II)** PBL Team	Break	**SGD / DISSECTION** Ascending Tracts and their clinicals	SDL Anatomy Anterior And middle Cranial Fossa

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects)
CBL / Small Group Discussion (Biochemistry and Physiology)

Sr. No	Batch	Roll No.
1.	A	01-70
2.	B	71-140
3.	C	141-210
4.	D	211-280
5.	E	281-onwards

Topics for Skill Lab with Venue

- Peripheral Nerve (Anatomy Histology Practical) Venue-Histology laboratory (Dr. Minahil Haq)
- Color test for Sterols (Biochemistry practical)
- (Physiology Practical) Examination of sensory nervous system Venue – Physiology Lab

Topics for SGDs / CBL with Venue

- Physiology SGD: Synapse & sensory Receptors (Venue: Lecture Hall No 5)
- Biochemistry SGD: Triglyceride Metabolism (Venue: Lecture Hall No 2)

Schedule for Practical / Small Group Discussion

Day	Histology Practical		Biochemistry Practical		Supervised by HOD	Physiology Practical		Physiology SGD		Supervised by HOD	Biochemistry SGD	
	Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name
Monday	C	Supervised by HOD	B	Dr. Rahat		E	Dr. Kamil	A	Dr. Aneela		D	Dr. Uzma
Tuesday	D		C	Dr. Nayab		A	Dr. Aneela	B	Dr. Shazia		E	Dr. Almas
Wednesday	E		D	Dr. Uzma		B	Dr. Shazia	C	Dr. Nayab		A	Dr. Romessa
Thursday	B		A	Dr. Almas		D	Dr. Iqra	E	Dr. Iqra		C	Dr. Nayab
Saturday	A		E	Dr. Romessa		C	Dr. Nayab	D	Dr. Kamil		B	Dr. Rahat

Table No. 2 Batch Distribution and Venues for Anatomy Small Group Discussion SGDs / Dissections

Batches	Roll No	Anatomy Teacher	Venue
A	01-90	Dr. Gaiti Ara	New Lecture Hall Complex # 01
B	91-180	Dr. Minahil Haq	New Lecture Hall Complex # 04
C	181-270	Dr. Tariq Furqan	Anatomy Lecture Hall 04
D	271 onwards	Dr. Sadia Baqir	Anatomy Lecture Hall 03

Supervised by Prof. Dr. Ayesha Yousaf

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Second Year Timetable for CNS Module (Second Week)
(05-08-2024 To 10-08-2024)

Date/Day	8:00am-9:20am	9:20am – 10:10am	10:10am – 10:30am	10:30am-11:20am	11:20am-12:10pm	12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignments
05-08-2024 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Somatosensory cortex and lesions of somatosensory cortex / Excitatory and inhibitory effects of sympathetic and parasympathetic stimulation Dr. Fahd (Even) / Dr. Uzma (Odd)	Break	**BIOCHEMISTRY (LGIS)** LDL, HDL metabolism / Fatty Acid Oxidation I Dr. Kashif (Even) / Dr. Aneela (Odd)	**PATHOLOGY** Patterns of injury in nervous system Dr. Nida Fatima (Even) / Dr Kiran Ahmad (Odd)	Break	**SGD / DISSECTION** Descending Tracts and their clinicals	SDL Physiology Sensory pathways for transmitting somatic signals-II
06-08-2024 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Excitatory and inhibitory effects of sympathetic and parasympathetic stimulation / Somatosensory cortex and lesions of somatosensory cortex Dr. Uzma (Even) / Dr. Fahd (Odd)		**ANATOMY (LGIS)** Histology Of spinal cord and peripheral nerve / Embryology Development of Rhombencephalon Asst. Prof. Dr. Maria Tasleem (Even) / Prof. Dr. Ifra Saeed (Odd)	**BIOCHEMISTRY (LGIS)** Fatty acid oxidation I / LDL, HDL metabolism Dr. Aneela (Even) / Dr. Kashif (Odd)		**SGD / DISSECTION** Lesions of Spinal Cord	SDL Physiology Physiology of pain Dual pathway for transmission of pain
07-08-2024 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Concept of Association areas, Concept of Dominant and non-dominant cerebral hemispheres / CSF, Blood Brain Barrier Blood CSF Barrier, Lumbar puncher Dr. Shazia (Even) / Dr. Maryam (Odd)		**ANATOMY (LGIS)** Embryology Development of Rhombencephalon / Histology Of spinal cord and peripheral nerve Prof. Dr. Ifra Saeed (Even) / Asst. Prof. Dr. Maria Tasleem (Odd)	**SURGERY** Spinal injury and Head injury Dr. Soban Sarwar Gondal(Even) / Dr. Usman Malik (Odd)		**SGD / DISSECTION** Medulla Oblongata	SDL Biochemistry HDL & LDL Metabolism
08-08-2024 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** CSF, Blood Brain Barrier Blood CSF Barrier, Lumbar puncher / Concept of Association areas, Concept of Dominant and non- dominant cerebral hemispheres Dr .Maryam (Even) / Dr. Shazia (odd)		**RADIOLOGY** Skull Radiograph Dr Riffat (Even) / Dr Saba (Odd)	**BIOCHEMISTRY (LGIS)** Hyperlipidemia And Fatty Liver / Fatty acid oxidation II Dr. Kashif (Even) / Dr. Aneela (Odd)		**SGD / DISSECTION** Pons & the Fourth Ventricle	SDL Anatomy Meninges, Spinal ,cord
09-08-2024 Friday	**8:00am-900am** **MEDICINE** Spinal cord and peripheral nervous system Dr Javeria Malik(Even) / Dr Riffat (Odd)	**9:00am-10:00am** **PHYSIOLOGY (LGIS)** Speech and aphasia / Limbic system, Functionsof hypothalamus Dr. Shazia (Even) / Dr. Maryam (Odd)		**10:00am-11:00am** **PAKSTUDIES/ISLAMMIYAT** Musawat / 1973 ka Aaeen Mufti Naem Sherazi (Even) / Qari Aman Ullah (Odd)	**11:00am-12:00pm** 1973 ka Aaeen / Musawat Qari Aman Ullah (Even) / Mufti Naem Sherazi (Odd)			
10-08-2024 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Limbic system, Functionsof hypothalamus / Speech and aphasia Dr. Maryam (Even) / Dr. Shazia (Odd)	Break	**ANATOMY (LGIS)** Histology of cerebellum / Embryology Development of Mesencephalon & Prosencephalon Asst. Prof. Dr. Maria (Even) / Prof. Dr. Ifra Saeed (Odd)	**OBS & GYNAE** Seizures during pregnancy(eclampsia/epilepsy) Dr Ismat Batool (Even) / Dr Sadia Waheed (Odd)	Break	**SGD / DISSECTION** Midbrain	SDL Anatomy Ascending tracts & Descending tracts

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects)
CBL / Small Group Discussion (Biochemistry and Physiology)

Sr. No	Batch	Roll No.
1.	A	01-70
2.	B	71-140
3.	C	141-210
4.	D	211-280
5.	E	281-onwards

Topics for Skill Lab with Venue

- (Anatomy Histology Practical) Ganglia Venue-Histology laboratory (Dr. Sadia Baqir)
- (Biochemistry Practical) Detection of Cholesterol Crystals
- (Physiology Practical) Examination of Motor System Venue – Physiology Lab

Topics for SGDs / CBL with Venue

- Physiology SGD: Autonomic Nervous System (Venue: Lecture Hall No 5)
- Biochemistry SGD: Fatty Acid Oxidation (Venue: Lecture Hall No 2)

Schedule for Practical / Small Group Discussion

Day	Histology Practical		Biochemistry Practical		Supervised by HOD	Physiology Practical		Physiology SGD		Supervised by HOD	Biochemistry SGD	
	Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name
Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Kamil	A	Dr. Aneela	Supervised by HOD	D	Dr. Uzma
Tuesday	D		C	Dr. Nayab		A	Dr. Aneela	B	Dr. Shazia		E	Dr. Almas
Wednesday	E		D	Dr. Uzma		B	Dr. Shazia	C	Dr. Nayab		A	Dr. Romessa
Thursday	B		A	Dr. Almas		D	Dr. Iqra	E	Dr. Iqra		C	Dr. Nayab
Saturday	A		E	Dr. Romessa		C	Dr. Nayab	D	Dr. Kamil		B	Dr. Rahat

Table No. 2 Batch Distribution and Venues for Anatomy Small Group DisscussionSGDs / Dissections

Batches	Roll No	Anatomy Teacher	Venue	
A	01-90	Dr. Gaiti Ara	New Lecture Hall Complex # 01	Supervised by Prof. Dr. Ayesha Yousaf
B	91-180	Dr. Minahil Haq	New Lecture Hall Complex # 04	
C	181-270	Dr. Tariq Furqan	Anatomy Lecture Hall 04	
D	271 onwards	Dr. Sadia Baqir	Anatomy Lecture Hall 03	

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

No PBL during this week

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

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Second Year Timetable for CNS Module (Third Week)
(12-08-2024 To 17-08-2024)

Date/Day	8:00am-9:20am	9:20am – 10:10am	10:10am – 10:30am	10:30am-11:20am	11:20am-12:10pm	12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignments
12-08-2024 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Learning & Memory / Reticular Activating System & Sleep Dr. Maryam (Even) / Dr. Fahd (Odd)	**Break**	**ANATOMY (LGIS)** Embryology Development of Mesencephalon & Prosencephalon / Histology of cerebellum Prof. Dr. Ifra Saeed (Even) / Asst. Prof. Dr. Maria Tasleem (Odd)	**PHYSIOLOGY SDL NO. 1** Somatosensory system & its lesions Dr. Ramsha (Odd) / Dr. Ali Zain (Even)	**Break**	**CBL/SGD/ DISSECTION** CBL (Cystic Astrocytoma of Cerebellum) Cerebellum	SDL Physiology CSF, BBB, Blood CSF Barrier, LP
13-08-2024 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** Reticular Activating System & Sleep / Learning & Memory Dr. Fahd (Even) / Dr. Maryam (Odd)		**BIOCHEMISTRY (LGIS)** Hyperlipidemia & Fatty Liver / Fatty acid Oxidation-II Dr. Kashif (Even) / Dr. Aneela (Odd)	**PHYSIOLOGY SDL NO. 2** CSF, BBB, Blood CSF Barrier, Lumbar puncher Dr. Maryam (Even) / Dr. Iqra (Odd)		**SGD / DISSECTION** Thalamus, Epithalamus, Subthalamus	SDL Physiology Muscle spindle & Golgi tendon organ
14-08-2024 Wednesday	**Independence Day**							
15-08-2024 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** EEG & Epilepsy / Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers Dr. Maryam (Even) / Dr Sidra (Odd)	**Break**	**BIOCHEMISTRY (LGIS)** Fatty acid synthesis / Cholesterol synthesis and regulation, hypercholesterolemia Dr Aneela (Even) / Dr. Kashif (Odd)	**PHYSIOLOGY SDL NO. 3** Introduction to ANS Dr. Farah (Even) / Dr. Najam us Sehar (Odd)	**Break**	**SGD / DISSECTION** Hypothalamus	SDL Biochemistry Fatty acid oxidation
16-08-2024 Friday	**8:00 AM – 9:00 AM** **BIOCHEMISTRY (LGIS)** Metabolism of Glycerophospholipids and siphonophore lipid / Ketone body metabolism Dr. Kashif (Even) / Dr. Aneela (Odd)	**9:00 AM – 10:00 AM** **PHYSIOLOGY (LGIS)** EEG & Epilepsy / Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers Dr Sidra (Even) / Dr. Maryam (Odd)		**10:00– 11:00AM** **PAKSTUDIES/ISLAMMIYAT** Khwateen k hakook / Qayam e Pakistan, Ibtidai Mushkilaat / Islmi Jamuraiat Mufti Naem Sherazi (Even) / Qari Aman Ullah (Odd)	**11:00– 12:00AM** Qayam e Pakistan, Ibtidai Mushkilaat / Islmi Jamuraiat / Khwateen k hakook Qari Aman Ullah(Even) / Mufti Naem Sherazi (Odd)		SDL Anatomy Medulla Oblongata & Pons & Cerebellum	
17-08-2024 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)** EEG & Epilepsy / Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers Dr Sidra (Even) / Dr. Maryam (Odd)	**Break**	**BIOCHEMISTRY (LGIS)** Cholesterol synthesis and regulation, hypercholesterolemia / Fatty acid synthesis Dr. Kashif (Even) / Dr. Aneela (Odd)	**MEDICINE (LGIS)** Cerebellar disorders Dr Javeria Malik (Even) / Dr Faran Maqbool (Odd)	**Break**	**SGD / DISSECTION** Cortical areas, Layers and Lesions of Cerebrum	SDL Anatomy Diencephalon *Online Clinical Evaluation

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects)
CBL / Small Group Discussion (Biochemistry and Physiology)

Sr. No	Batch	Roll No.
1.	A	01-70
2.	B	71-140
3.	C	141-210
4.	D	211-280
5.	E	281-onwards

Topics for Skill Lab with Venue

- (Anatomy Histology Practical) Spinal Cord Venue-Histology laboratory (Dr. Gaiti Ara)
- (Biochemistry Practical) Estimation of serum TAGS
- (Physiology Practical) Examination of Cerebellar System Venue – Physiology Lab Lab

Topics for SGDs / CBL with Venue

- Anatomy CBL: Cystic Astrocytoma of Cerebellum
- Physiology SGDs: Motor nervous system, muscle spindle and Golgi tendon organ (Venue: Lecture Hall No 5)
- Biochemistry CBL: Respiratory Distress syndrome (Venue: Lecture Hall No 2)

Schedule for Practical / Small Group Discussion

Day	Histology Practical		Biochemistry Practical		Supervised by HOD	Physiology Practical		Physiology SGD		Supervised by HOD	Biochemistry SGD	
	Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name
Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Kamil	A	Dr. Aneela	Supervised by HOD	D	Dr. Uzma
Tuesday	D		C	Dr. Nayab		A	Dr. Aneela	B	Dr. Shazia		E	Dr. Almas
Wednesday	E		D	Dr. Uzma		B	Dr. Shazia	C	Dr. Nayab		A	Dr. Romessa
Thursday	B		A	Dr. Almas		D	Dr. Iqra	E	Dr. Iqra		C	Dr. Nayab
Saturday	A		E	Dr. Romessa		C	Dr. Nayab	D	Dr. Kamil		B	Dr. Rahat

Table No. 2 Batch Distribution and Venues for Anatomy Small Group DisscussionSGDs / Dissections

Batches	Roll No	Anatomy Teacher	Venue
A	01-90	Dr. Gaiti Ara	New Lecture Hall Complex # 01
B	91-180	Dr. Minahil Haq	New Lecture Hall Complex # 04
C	181-270	Dr. Tariq Furqan	Anatomy Lecture Hall 04
D	271 onwards	Dr. Sadia Baqir	Anatomy Lecture Hall 03

Supervised by Prof. Dr. Ayesha Yousaf

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

No PBL during this week

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Second Year Timetable for CNS Module (Fourth Week)
(19-08-2024 To 24-08-2024)

Date/Day	8:00am-9:20am	9:20am – 10:10am		10:10am – 10:30am	10:30am-11:20am		11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignments
19-08-2024 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)**		Break	**SURGERY**		**MEDICINE**		Break	**SGD / DISSECTION**	SDL Physiology Hypothalamus
		Introduction to Cerebellum, Neuronal Circuits of Cerebellum & Its Motor functions	Muscle Spindle & Golgi Tendon organ, role of muscle spindle & Golgi tendon organ in voluntary motor activity		Management of hydrocephalus		Epilepsy and other convulsive disorders			Dissection	
		Dr. Faizania (Even)	Dr. Sidra (Odd)		Dr. Fraz Mehmood (Even)	Dr. Ammad ul Haq (Odd)	Dr Javeria Malik (Even)	Dr Faran Maqbool (Odd)			
20-08-2024 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY LGIS**			**ANATOMY (LGIS)**		**PBL 2 (SESSION-I)**			**SGD / DISSECTION**	SDL Physiology Properties of reflex action, Control of spinal cord reflexes by higher centers
		Muscle Spindle & Golgi Tendon organ, role of muscle spindle & Golgi tendon organ in voluntary motor activity	Introduction to Cerebellum, Neuronal Circuits of Cerebellum & Its Motor functions		Histology of Cerebrum	Embryology Development of Peripheral and Autonomic Nervous System	PBL Team			Lateral ventricle, Ventricular system, CSF and Blood Brain Barrier	
		Dr. Sidra (Even)	Dr. Fazania (Odd)		Asst. Prof. Dr Maria Tasleem (Even)	Prof. Dr. Ifra Saeed (Odd)					
21-08-2024 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY SDL NO. 4**			**ANATOMY (LGIS)**		**MEDICINE**			**SGD / DISSECTION**	SDL Biochemistry Synthesis &Interconversion of Ketone Bodies (diagrammatically) Regulation of Ketogenesis Ketolases
		EEG & Epilepsy			Embryology Development of Peripheral and Autonomic Nervous System	Histology of Cerebrum	Encephalitis			Cranial nerves-I,II,II,IV,VI	
		Dr Maryam (Even)	Dr. Iqra (Odd)		Prof. Dr. Ifra Saeed (Even)	Asst. Prof. Dr. Maria Tasleem (Odd)	Dr Javeria Malik (Even)	Dr Faran Maqbool(Odd)			
22-08-2024 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY SDL NO 5**			**BIOCHEMISTRY SDL**		**PBL 2 (SESSION-II)**			**SGD / DISSECTION**	SDL Biochemistry
		Reticular Activating System & Sleep			Glycerophospholipids & Sphingolipids		PBL Team			Cranial nerves - V, VII	
		Dr Farah (Even)	Dr. Ali Zain (Odd)		Dr. Uzma Zafar (Odd)	Dr. Rahat (Even)					
23-08-2024 Friday	**8:00 AM – 9:00 AM** **Practical & CBL/SGD** Topics & Venue Mentioned at the end. **(Wednesday Batch 14-08-2024)**	**9:00 AM – 10:00 AM** **PHYSIOLOGY SDL NO 6**			**10:00– 11:00AM** **SGD / DISSECTION**		**11:00AM – 12:00PM**			SDL Anatomy Lateral ventricle, Ventricular system, CSF and Blood Brain Barrier	
		Motor Cortex & Physiological Importance of Neocortex, Cortico Spinal or pyramidal Tract Extra Pyramidal System			Cranial Nerves VIII-XII						
		Dr Maryam (Even)	Dr Iqra (Odd)								
24-08-2024 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Early Clinical Exposure (ECE)**									SDL Anatomy Cranial Nerves 1-7

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects)
CBL / Small Group Discussion (Biochemistry and Physiology)

Sr. No	Batch	Roll No.
1.	A	01-70
2.	B	71-140
3.	C	141-210
4.	D	211-280
5.	E	281-onwards

Topics for Skill Lab with Venue

- (Anatomy Histology Practical) Cerebellum Venue-Histology laboratory (Dr. Minahil Haq)
- (Biochemistry Practical) Estimation of Serum HDL
- (Physiology Practical) Ophthalmoscopy Venue – Physiology Lab

Topics for SGDs / CBL with Venue

- Physiology SGD: Motor Nervous System (Venue: Lecture Hall No 5)
- Biochemistry CBL: Ischemic Heart disease (Venue :Lecture Hall No 2)

Schedule for Practical / Small Group Discussion

Day	Histology Practical		Biochemistry Practical		Supervised by HOD	Physiology Practical		Physiology SGD		Supervised by HOD	Biochemistry SGD	
	Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name
Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Kamil	A	Dr. Aneela	Supervised by HOD	D	Dr. Uzma
Tuesday	D		C	Dr. Nayab		A	Dr. Aneela	B	Dr. Shazia		E	Dr. Almas
Wednesday	E		D	Dr. Uzma		B	Dr. Shazia	C	Dr. Nayab		A	Dr. Romessa
Thursday	B		A	Dr. Almas		D	Dr. Iqra	E	Dr. Iqra		C	Dr. Nayab
Saturday	A		E	Dr. Romessa		C	Dr. Nayab	D	Dr. Kamil		B	Dr. Rahat

Table No. 2 Batch Distribution and Venues for Anatomy Small Group DisscussionSGDs / Dissections

Batches	Roll No	Anatomy Teacher	Venue	
A	01-90	Dr. Gaiti Ara	New Lecture Hall Complex # 01	Supervised by Prof. Dr. Ayesha Yousaf
B	91-180	Dr. Minahil Haq	New Lecture Hall Complex # 04	
C	181-270	Dr. Tariq Furqan	Anatomy Lecture Hall 04	
D	271 onwards	Dr. Sadia Baqir	Anatomy Lecture Hall 03	

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Second Year Timetable for CNS Module (Fifth Week)
(26-08-2024 To 31-08-2024)

Date/Day	8:00am-9:20am	9:20am – 10:10am		10:10am – 10:30am	10:30am-11:20am		11:20am-12:10pm		12:10pm-12:30pm	12:30pm – 2:00pm	Home Assignments
26-08-2024 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)**		Break	**MEDICINE**		**FAMILY MEDICINE**		Break	**SGD / DISSECTION**	SDL Physiology Introduction to cerebellum Neuronal circuits of cerebellum
		Manifestations of Cerebellar Disease	Poly synaptic reflexes & transaction of spinal cord, role of brain stem in controlling motor function & lesions of motor system		Stroke		Approach to a patient with neuronal disease			Basal Ganglia	
		Dr Fazania (Even)	Dr. Sidra (Odd)		Dr Javeria Malik (Even)	Dr Faran Maqbool (Odd)	Dr. Sadia				
27-08-2024 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)**			**PHYSIOLOGY SDLNO. 7**		**BEHAVIORAL SCIENCES**			**SGD / DISSECTION**	SDL Physiology Basal Ganglia & Lesions
		Poly synaptic reflexes & transaction of spinal cord, role of brain stem in controlling motor function & lesions	Manifestations of Cerebellar Disease		Limbic System & function of Hypothalamus		Memory & Emotions			Limbic system and Reticular Formation	
		Dr. Sidra (Even)	Dr Fazania (Odd)		Dr. Maryam (Odd)	Dr. Iqra (Even)	Dr. M. Azeem Rao (Even)	Dr. Zarnain Umar (Odd)			
28-08-2024 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)**			**RADIOLOGY**		**SURGERY**			**CBL/SGD/ DISSECTION**	SDL Biochemistry Synthesis of Cholesterol and its regulation
		Basal Ganglia & Lesions	Motor Cortex & Physiological importance of Neocortex, Cortico Spinal or Pyramidal tracked, Extra pyramidal Systems		CT scan and MRI (Brain and Spinal Cord)		Poly trauma patient			CBL(Middle Cerebral Artery Stroke) Blood supply of Brain and Clinicals	
		Dr. Uzma (Even)	Dr Maryam (Odd)		Dr Anum Zahoor (even)	Dr Faisal (odd)	Dr. Fraz Mehmood (Even)	Dr. Ali Tasaddaq(Odd)			
29-08-2024 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY (LGIS)**			**ANATOMY (LGIS)**		**BEHAVIORAL SCIENCES**			**SGD / DISSECTION**	SDL Anatomy Cranial nerves 8-12, Basal Ganglia, Limbic system and Reticular Formation
		Motor Cortex & Physiological importance of Neocortex, Cortico Spinal or Pyramidal tracked, Extra pyramidal Systems	Basal Ganglia & Lesions		Development of Cranium	Development of Cranium	Metacognition			Radiological Imaging of CNS	
		Dr Maryam (Even)	Dr. Uzma (Odd)		Prof. Dr. Ifra Saeed (Odd)	Prof. Dr. Saima (Even)	Dr. Zarnain Umar(even)	Dr. Sadia Yasir(odd)			
30-08-2024 Friday	**8:00 AM – 9:00 AM**	**9:00 AM – 10:00 AM**			**10:00 – 11:00AM**		**11:00AM – 12:00PM**			SDL Anatomy	
	QURAN TRANSLATION IV	**QURAN TRANSLATION V**			**BIOCHEMISTRY (LGIS)**		**PHYSIOLOGY SDL NO.8**				
	Momalat-I	Momalat-II			Metabolism of Glycerophospholipids and sphingophospho lipid	Ketone Body Metabolism	Learning & Memory				
	Mufti Naeem Sherazi (Odd)	Mufti Naeem Sherazi (Even)			Dr. Kashif (Even)	Dr. Aneela (Odd)	Dr Nayab (Even)	Dr. Iqra (Odd)			
31-08-2024 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**PHYSIOLOGY SDL NO. 09**		Break	**PHYSIOLOGY SDL NO. 10**		**ISLAMIYAT**		Break	**SGD/ DISSECTION**	SDL Biochemistry Online Clinical Evaluation
		Gasal Ganglia & its Lesions			Sensory Pathways for Transmitting somatic Signals		Haj tul Wida Khutba			Cross Sectional Study / Dissection	
		Dr. Maryam (Odd)	Dr. Iqra (Even)		Dr. Jawad (Even)	Dr. Usman (Odd)	Mufti Naeem Shirazi				

Table No. 1 (Time: 12:20pm – 02:00pm)

Batch Distribution for Practical Skills (all subjects)
CBL / Small Group Discussion (Biochemistry and Physiology)

Sr. No	Batch	Roll No.
1.	A	01-70
2.	B	71-140
3.	C	141-210
4.	D	211-280
5.	E	281-onwards

Topics for Skill Lab with Venue

- (Anatomy Histology Practical) Cerebrum. Venue-Histology laboratory (Dr. Sadia Baqir)
- (Biochemistry Practical) Lipid Solubility & Acrolein test
- (Physiology Practical) Determination of field of vision Venue – Physiology Lab

Topics for SGDs / CBL with Venue

- Anatomy CBL: Middle Cerebral Artery Stroke
- Physiology SGD: Basal Ganglia & limbic system (Venue: Lecture Hall No 5)
- Biochemistry SGD: Ketone body metabolism (Venue: Lecture Hall No 2)

Schedule for Practical / Small Group Discussion

Day	Histology Practical		Biochemistry Practical		Supervised by HOD	Physiology Practical		Physiology SGD		Supervised by HOD	Biochemistry SGD	
	Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name	Batch	Teacher Name		Batch	Teacher Name
Monday	C	Supervised by HOD	B	Dr. Rahat	Supervised by HOD	E	Dr. Kamil	A	Dr. Aneela	Supervised by HOD	D	Dr. Uzma
Tuesday	D		C	Dr. Nayab		A	Dr. Aneela	B	Dr. Shazia		E	Dr. Almas
Wednesday	E		D	Dr. Uzma		B	Dr. Shazia	C	Dr. Nayab		A	Dr. Romessa
Thursday	B		A	Dr. Almas		D	Dr. Iqra	E	Dr. Iqra		C	Dr. Nayab
Saturday	A		E	Dr. Romessa		C	Dr. Nayab	D	Dr. Kamil		B	Dr. Rahat

Table No. 2 Batch Distribution and Venues for Anatomy Small Group DisscussionSGDs / Dissections

Batches	Roll No	Anatomy Teacher	Venue
A	01-90	Dr. Gaiti Ara	New Lecture Hall Complex # 01
B	91-180	Dr. Minahil Haq	New Lecture Hall Complex # 04
C	181-270	Dr. Tariq Furqan	Anatomy Lecture Hall 04
D	271 onwards	Dr. Sadia Baqir	Anatomy Lecture Hall 03

Supervised by Prof. Dr. Ayesha Yousaf

Table No. 3 Batch Distribution with Venues and Teachers Name for Problem Based Learning (PBL) Sessions

Sr No.	Batches	Roll No	Venue	Teachers	Sr No.	Batches	Roll No	Venue	Teachers
1.	A1	(01-35)	Lecture Hall no.05 Physiology	Dr. Sana Latif (Demonstrator Biochemistry)	6.	C2	(176-210)	Lecture Hall no.04 (Basement)	Dr. Nayab Zonish (PGT Physiology)
2.	A2	(36-70)	Lecture Hall #.04 (1st Floor Anatomy)	Dr. Farah (Demonstrator of Physiology)	7.	D1	(210-245)	Lecture Hall no.02 (Basement)	Dr. Iqra Ayub (PGT Physiology)
3.	B1	(71-105)	Anatomy Museum (First Floor Anatomy)	Dr. Rohina Khalid (Demonstrator Biochemistry)	8.	D2	(246-280)	Conference Room (Basement)	Dr. Muhammad Usman (PGT Physiology)
4.	B2	(106-140)	Lecture Hall no.03 (First Floor)	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)	9.	E1	(281-315)	New Lecture Hall no.01	Dr. Ramsha (PGT Physiology)
5.	C1	(141-175)	Lecture Hall no.05 (Basement)	Dr. Ali Zain (PGT Physiology)	10	E2	(315 onwards)	Lecture Hall no.04	Dr. Jawad Hassan (Demonstrator Physiology)

No PBL during this week

Table No. 6 Venues for Large Group Interactive Session (LGIS)

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Schedule for LMS Based Weekly Online Assessments for Second Year MBBS (CNS Module) Batch 50

The online assessment for CNS Module for Second Year MBBS will be as per following schedule:

Class	Module	Day & Date	Time of Assessment	Focal person	Department Responsible
Second Year MBBS	CNS Module	Monday 05th August,2024	9:00 pm-9:30pm	Prof. Dr Ayesha Yousaf	Anatomy
		Tuesday 06th August,2024	9:00 pm-9:30pm	Prof. Dr Samia Sarwar	Physiology
		Wednesday 07th August, 2024	9:00 pm-9:30pm	Dr Aneela Jamil	Biochemistry
		Monday 12th August,2024	9:00 pm-9:30pm	Prof. Dr Ayesha Yousaf	Anatomy
		Tuesday 13th August, 2024	9:00 pm-9:30pm	Prof. Dr Samia Sarwar	Physiology
		Thursday 15th August,2024	9:00 pm-9:30pm	Dr Aneela Jamil	Biochemistry
		Monday 19th August,2024	9:00 pm-9:30pm	Prof. Dr Ayesha Yousaf	Anatomy
		Tuesday 20th August,2024	9:00 pm-9:30pm	Prof. Dr Samia Sarwar	Physiology
		Wednesday 21st August,2024	9:00 pm-9:30pm	Dr Aneela Jamil	Biochemistry

Second Year Timetable for CNS Module (Sixth Week)
(02-09-2024 to 07-09-2024)

Date / Day	8:00 AM – 9:00 AM	12:00-02:00pm
02-09-2024 Monday	Assessment Week	
03-09-2024 Tuesday		
04-09-2024 Wednesday		
05-09-2024 Thursday		
06-09-2024 Friday		
07-09-2024 Saturday		

Note: Detailed notice regarding content, time and venue will be issued accordingly

Note: Timetable Subject to change according to the current circumstances.

SECTION-VII

Table of Specification (TOS) For CNS Module Examination

Blue Print of Assessment for First Year & Second Year MBBS

Table of Specification

Tools of Asssessment: Cognitive: MCQ- Multiple Choice Questions, EMQs- Extended Matching Questions, SAQ- Short Answer Questions, SEQ- Short Essay Questions Psychomotor: AvOSPE- Audio Visual Assisted Objective Structured Pactical Examination, labOSPE- Laboratory Based Objective Structured Practical Examination, IOSPE- Integrated Objective Structured Practical Examination, COSPE- Clinically Oriented Objective Structed Practical Examination Affect: AED Reflective Writing- Artificial Intelligence, Entraprenureship, Digital Literacy based reflective writing, OSVE- Objective Structured Viva Assessment

Domains: C-Core Subject (70%) Levels C1-C2, HV- Horizontal & Vertical Integration (20%) Levels C2-C3, S- Spiral Integration (10%) Levels C2-C3

End of Module Assessment	Subject	Theory (Cognitive) Assessment																			Practical (Skill & Attitude) Assessment										Grand Total	Total Time of Module Assessment
		MCQs					EMQs			SAQs					SEQs				Marks	Total Marks Theory	Total Time	AV OSPE					Time	AED Reflective Writing	OSVE			Total Practical Marks		
		C	HV	S	Total	Marks	C	Total	Marks	C	HV	S	Total	Marks	C	HV	S	Total				C	HV	S	Total	Marks			Viva	Copy	Total			
First Module	Anatomy	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
	Physiology	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
	Biochemistry	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Formative- Weekly LMS Based Assessment of 30 MCQs (10 MCQs per Subject)																																	
End of Module Assessment	Subject	Theory (Cognitive) Assessment																			Practical (Skill & Attitude) Assessment										Grand Total	Total Time of Module Assessment
		MCQs					EMQs			SAQs					SEQs				Marks	Total Marks Theory	Total Time	AV OSPE					Time	AED Reflective Writing	OSVE			Total Practical Marks		
		C	HV	S	Total	Marks	C	Total	Marks	C	HV	S	Total	Marks	C	HV	S	Total				C	HV	S	Total	Marks			Viva	Copy	Total			
Second Module	Anatomy	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
	Physiology	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
	Biochemistry	19	4	2	25	25	1	1	5	3	1	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Formative- Weekly LMS Based Assessmen tof 30 MCQs (10 MCQs per Subject)																																	

Block	Subjects	LMS Based Assessment					OSPE						Grand Total	Total Block Time
		MCQs					LabOSPE	IOSPE	COSPE	Total	Marks	Time		
		C	HV	S	Total	Time	C	HV	S					
BLOCK	Anatomy	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	6.5 HRS
	Physiology	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	6.5 HRS
	Biochemistry	21	6	3	30	30 min	14	4	2	20	60	6 HRS	90	6.5 HRS

50% Questions/OSPE Stations/Viva Stations will be from Foundation Module and 50% Questions will be from MSK-1 Module

For Each assessment student will have to individually pass Theory and Practical components

Weekly LMS Assessment			
Subjects	Anatomy	Physiology	Biochemist
No of MCQs*	30	30	30
Marks/MCQ	30	30	30
*MCQ=1 Mark each, 1 min each			

Marks per Item

MCQ=1	EMQ= 5	SAQ= 5	SEQ= 9	AVOSPE= 5	OSPE= 3

OSPE Time=1 Round of 40 Students =80 min

3 Round of 40 Students =240 min

OSVE=Time per student=5mins

Table of Specification for Integrated OSPE

Anatomy					
Sr. #	**Topics**	**Knowledge**	**Skill**	**Attitude**	**Marks**
Block II – Reproduction & CNS					
1	Development of Reproductive System	30%	50%	20%	3
2	Development of Nervous System				3
3	Microscopic anatomy of Reproductive System				3
5	Microscopic anatomy of Nervous System				3
Physiology					
1	Examination of sensory system	30%	50%	20%	3
2	Examination of motor system				3
3	Examination of cerebellar functions				3
4	Examination of cranial nerves				3
5	Performance of pregnancy test				3
6	Practical note book / sketch copy				3
Biochemistry					
1	Quantitative estimation of Serum Uric Acid	100%			2
2	Quantitative estimation of Serum Cholesterol				
3	Quantitative estimation of Serum HDL Cholesterol	100%	90%	10%	2
4	Quantitative estimation of Serum LDL Cholesterol				
5	Quantitative estimation of Serum Triglycerides (TAG)	100%	80%	20%	2
6	Practical notebook				

Table of Specification for Gross Anatomy OSPE

Sr. #	Topics	Knowledge	Skill	Attitude	Marks
Block II- Pelvis and CNS					
1	Bones of pelvis	30%	50%	20%	3
2	Structures of Male pelvis				3
3	Structures of Female pelvis				3
4	External genitalia				3
5	Radiology of Pelvis				3
6	Meninges				3
7	Brain Stem and cerebellum				3
8	Diencephalon and telencephalon				3
9	Cranial fossae				3
10	Radiology of Skull (cranial fossae)				3

Annexure I

(Sample MCQ, SAQ, SEQ Papers, AV OSPE, OSPE)

Note: These sample papers aim to facilitate comprehension. However, it's important to note that the content and format of actual assessment papers may differ.

RAWALPINDI MEDICAL UNIVERSITY, RWP
ANATOMY DEPARTMENT
2nd Year MBBS Module Exam (CNS)

1. A patient was unable to maintain his balance with feet & heel close together. He was also unable to detect sensations of vibration when vibrating tuning fork was placed on joints of lower limb. Which of the following spinal cord tract is likely to be effected?
    a. Rubrospinal
    b. Corticospinal
    c. Fasciculus gracilis
    d. Fasciculus cuneatus
    e. Lateral spinothalamic

2. A diagnosed case of hypertension presented with weakness of left lower limb and difficulty in movements. On examination he also had impaired sensations of two point discrimination and vibration. On protrusion of the tongue it deviated to right side. Depending on the knowledge of Neuroanatomy which part is affected?
    a. Midbrain
    b. Pons
    c. Medulla oblongata
    d. Cerebellum
    e. Hypothalamus

3. A 75-year-old female suffered a stroke that produced loss of pain and temperature sensations from the left side of her face (along her forehead, cheek, and jaw). She had no other sensory or motor losses. Her physician advised MRI of brain to rule out the cause. Which structure is most likely to be suffered?
    a. Left medial lemniscus
    b. Right spinal trigeminal nucleus
    c. Left spinothalamic tract
    d. Right spinothalamic tract
    e. Left spinal trigeminal nucleus

4. Computed tomography (CT) scan showed an area of hemorrhage in the region of the calcarine fissure. To determine the most likely neurologic deficit produced by this hematoma, which test should be performed?
    a. Rapid independent finger movements
    b. Visual fields
    c. Cognitive functions in word definition
    d. Tongue movements
    e. Muscle tone and coordination

5. Internal capsule is a white matter structure situated in each cerebral hemisphere. Which one of the following passes through the sub lentiform part of internal capsule?
    a. Optic Radiation
    b. Auditory Radiation
    c. Temporopontine fibres
    d. Anterior Thalamic radiation
    e. Corticonuclear fibres

Note: MCQs on USMLE Pattern

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE EXAM 2ND YEAR MBBS
ANATOMY SEQS

Note: Attempt all questions. All questions carry equal marks. Draw diagram where necessary

1. a. A 45-year-old man was brought to OPD. His family explained that he had been experiencing progressive weakness and difficulty in walking. They also mentioned that he had a respiratory infection a few weeks ago. After examination and tests he was diagnosed as a case of Guillain Barre Syndrome affecting peripheral nervous system. Draw the histological section of structure affected in this condition. (2)

   b. Enlist the cells present in different layers of cerebrum. (1)

   c. Enumerate nuclei of cerebrum (1)

2. a. Tabulate the adult derivatives from walls and cavities of primary and secondary brain vesicles. (2)

   b. A 25-year-old male, presented with intractable headache, dizziness, and coordination difficulties. MRI confirmed cerebellar tonsillar herniation due to congenital malformation. Describe its embryological basis? What complication can arise in this case? (2)

   c. What is Lateral Lemniscus (2)

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE 2ND YEAR MBBS
PHYSIOLOGY MCQS

1. Neurotransmitter concerned with slow chronic pain is:

    a. glutamate
    b. acetyl choline
    c. GABA
    d. substance P
    e. calcitonin gene-related peptide

2. The movement that is integrated at spinal cord level is:

    a. Turning of head
    b. Turning of eyes
    c. Walking
    d. Writing
    e. Jumping

3. A 62-year-old male is evaluated by a neurologist after a stroke. The doctor observed defect in sequencing & coordination of motor activities. The organ damaged is:

    a. Cerebellum
    b. Medulla
    c. Cortical motor strip
    d. Pons
    e. Eighth cranial nerve

4. When the awake person's attention is directed to some specific type of mental activity, the alpha waves in EEG are replaced by:

    a. Theta waves
    b. Delta waves
    c. Beta waves
    d. Gamma waves
    e. Epsilon waves

Note: MCQs on USMLE Pattern

5. When the awake person's attention is directed to some specific type of mental activity, the alpha waves in EEG are replaced by:

    a. Theta waves
    b. Delta waves
    c. Beta waves
    d. Gamma waves
    e. Epsilon waves

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE 2ND YEAR MBBS
ANATOMY EMQs

Options:

A. Ischemic stroke

B. Hemorrhagic stroke

C. Transient ischemic attack (TIA)

D. Subarachnoid hemorrhage

E. Lacunar infarct

F. Thrombolytic therapy

G. Carotid endarterectomy

H. Antiplatelet therapy

I. Anticoagulation therapy

J. Intracerebral hemorrhage

Questions:

1. A 70-year-old male presents with sudden onset of right-sided weakness and slurred speech. His symptoms started two hours ago. He has a history of hypertension and diabetes. CT scan shows no hemorrhage.

   What is the most likely diagnosis?

2. A 60-year-old female experiences a sudden severe headache described as "the worst headache of her life," followed by loss of consciousness. On examination, she has neck stiffness and photophobia.

   What is the most likely diagnosis?

3. A 55-year-old male has a history of atrial fibrillation and presents with a sudden onset of left-sided weakness. Imaging shows a clot in the middle cerebral artery.

   Which treatment is most appropriate if he arrived within 3 hours of symptom onset?

4. A 65-year-old female with a history of multiple TIAs presents with transient right-sided weakness and speech difficulties that resolved within 15 minutes.

   What is the most appropriate initial treatment to prevent future events?

5. A 75-year-old male presents with progressive numbness and weakness on the right side of his body over several days. CT scan reveals a small, deep infarct in the brain.

   What is the most likely diagnosis?

Answers:

1. **A. Ischemic stroke**
2. **D. Subarachnoid hemorrhage**
3. **F. Thrombolytic therapy**
4. **H. Antiplatelet therapy**
5. **E. Lacunar infarct**

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE 2ND YEAR MBBS
PHYSIOLOGY SEQS

Q.1 a) Compare dorsal column medial leminiscal system and antrolateral system for transmission of sensory nervous system? **(3)**

b) What is Stretch reflex **(1)**

c) Describe the role of golgi tendon organ in inverse stretch reflex. **(2)**

Q.2 . a) Give the physiological basis of sleep. **(2)**

b) What is turn on and turn off phenomenon. (1)

c) Why knee jerk becomes pendular in lesion of cerebellum. **(2)**

1. Oxidation of fatty acid decrease in:

   a. Starvation
   b. Diabetes mellitus
   c. Decreased intake of carbohydrate in diet
   d. Well fed state
   e. Excessive carnitine

2. 3- hydroxybutyrate:

   a. Synthesis is increased after high carbohydrate diet
   b. Synthesis is dependent on NADPH
   c. Is increased in ketoacidosis
   d. Is mainly excreted from lungs during respiration
   e. Is directly converted to acetone.

3.Inherited defect in enzymes of β oxidation cause:

   a. Hyperglycemia
   b. Ketoacidosis
   c. Hypoglycemia
   d. Fatty liver
   e. Methylmalonic aciduria

4. A 55-year-old male patient presents with elevated cholesterol levels. Laboratory tests reveal increased LDL cholesterol and total cholesterol levels. Which of the following enzymes is primarily responsible for the regulation of cholesterol synthesis?

   A. HMG-CoA reductase
   B. Acetyl-CoA carboxylase
   C. Fatty acid synthase
   D. Lipoprotein lipase
   E. Phosphatidate phosphatase

Note: MCQs on USMLE Pattern

SEQ

Q. a. Describe the metabolism of chylomicrons. (02)

b. Discuss causes of carnitine deficiency. (02)

c. What is systemic primary carnitine deficiency syndrome. (01)

RAWALPINDI MEDICAL UNIVERSITY DEPARTMENT OF BIOETHICS
2ND YEAR MBBS
CNS MODULE

1. ----Includes rules of conduct that may be used to regulate our activities concerning the biological world.
   a. Bio-piracy
   b. Biosafety
   c. Bioethics
   d. Bio-patents
   e. Bio-logistic

2. The right of patients having self-decision is called.
   a. Justice
   b. Autonomy
   c. Beneficence
   d. Veracity
   e. Fidelity

3. Following is not code of ethics.
   a. Integrity
   b. Objectivity
   c. Confidentiality
   d. Behavior
   e. Autonomy

4. -------in the context of medical ethics, if it's fair and balanced
   a. Justice
   b. Autonomy
   c. Beneficence
   d. Veracity
   e. Fidelity

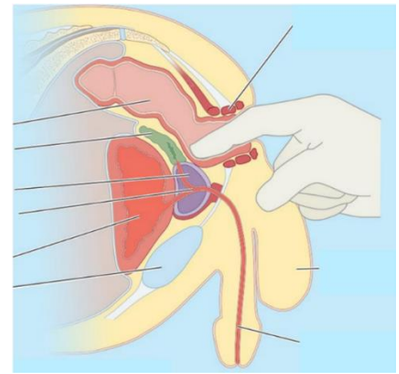
5. ------Principle requiring that physicians provide, positive benefits
   a. Justice
   b. Autonomy
   c. Beneficence
   d. Veracity
   e. Fidelity

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF ANATOMY
2nd Year MBBS OSPE Block-II

Station No. 1 Time Allowed: 2 Min

Histology sketch copy will be assessed for

a. Complete index (1)
b. Complete and signed diagrams (1)
c. 2 ID points mentioned with each diagram (1)
d. Punctuality (1)
e. Neatness (1)



Station No. 2 Time Allowed: 2 Min

a. Identify Red (1)
b. Identify Yellow (1)
c. Identify Green (1)
d. Look at the picture given below and answer the following questions

IV a. What is this examination called? (1)
b. Which structure is examined by this technique? (1)

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF PHYSIOLOGY
2nd Year MBBS OSPE Block-II

Station No. Time Allowed: 2 Minutes

MRI of a patient suggests thrombosis of superior cerebellar artery,

a. Enlist some signs & symptoms exhibited. (2)

b. Will he experience any motor deficit? (0.5)

c. Grade his reflexes (0.5)

Station No. Time Allowed: 2 Minutes

a. Which cranial nerve assessed with the given instrument. (0.5)

b. Give afferent & efferent of gag reflex. (0.5)

c. How will you assess XII nerve? (2)

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF BIOCHEMISTRY
2nd Year MBBS OSPE Block-II

Station No. 1 Time Allowed: 2 Mins

Observed Station

Pipette out 100 microliters from given solution 03

Station No. 2 Time Allowed: 2 Mins

Observed Station

Observe the slide under the microscope. Give one identifying feature. 03

AV OSPE
DEPARTMENT OF ANATOMY

Slide 1

Total Marks: 05 marks

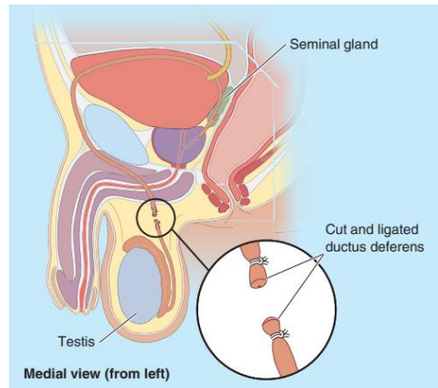
Time Allotted: 05 minutes

Requirements: Answer sheet, Pen

Objectives: _____

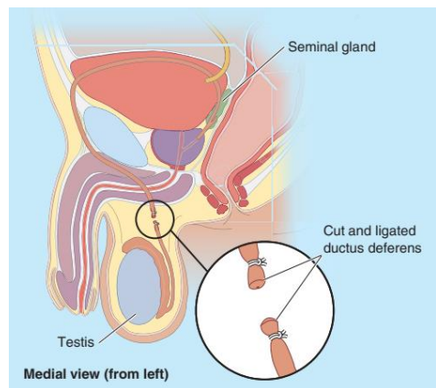
Slide 1

I. Identify Structure
   "A"
   "B"
   "C" (3)
II. Name the procedure (1)
III. What is it used for? (1)



Keys Slide 1

I. A- Anterior Lobe of Prostate
   B- Cut and ligated Vas Deferens (2)
II. Vasectomy (1)
III. Male sterilization (1)
IV. Yes in most cases (1)



Slide 2

Total Marks: 05 marks

Time Allotted: 05 minutes

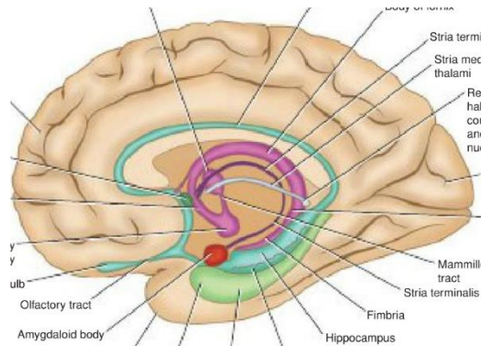
Requirements: Answer sheet, Pen

Objectives: _____

Slide 2

I. Identify the structures
A-
B
C
D

II. Name the clinical condition affecting A



Slide 2

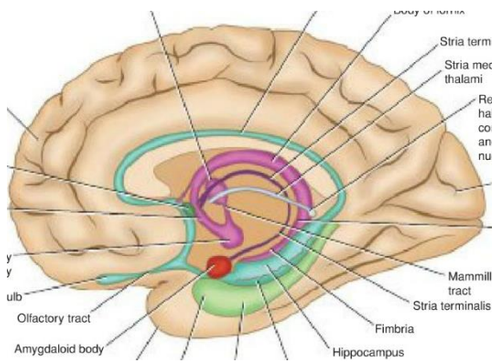
I. A- Amygdala

B- Body of Fornix

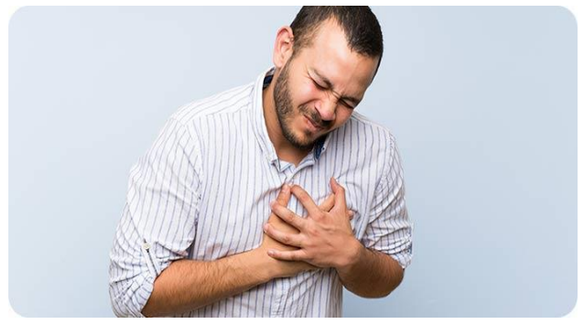
C- Mamillary Bodies

D- Anterior Nucleus of thalamus

II. Klüver-Bucy syndrome



AV OSPE
DEPARTMENT OF BIOCHEMISTRY



Slide 1

Total Marks: 05 marks

Time Allotted: 05 minutes

Requirements: Answer sheet, Pen

Objectives: _____

A 46 years male presented in ER with severe chest pain associated with nausea and sweating. Laboratory examination showed raised plasma cholesterol level.

Q1. What is the normal plasma cholesterol level? (01)
Q2. Write the causes of hypercholesterolemia. (01)

Q3. Which drugs can be used to lower plasma cholesterol level? (01)

Q4. Give the difference between LDL (low-density lipoprotein) and HDL (high-density lipoprotein). (01)

Q5. What is Bad Cholesterol. (01)